The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLI. August 26, 1939 No. 1,052

Calm and Steadfast

AS last September the business community is setting an admirable example of calm steadfastness. Far from being rattled by the outpourings of politicians and Press it has sat tight and got on with its job. It will continue to get on with its job no matter what befalls, and its cheerful determination may prove a decisive factor in the latest international crisis into which the world has been plunged.

There could be no greater mistake than the assumption eagerly made in faint-hearted quarters, that Great Britain has lost prestige, influence or actual power by the decision of Russia to conclude a Non-Aggression pact with Germany.

Herr Hitler's sensational coup is a sign of weakness rather than of strength. If anybody outside Germany could not see the true position clearly before, his eyes must be wide open now. The bottom has been knocked out of the theory that two ideologies, dictatorships and democracy, are struggling for mastery. All meaning has disappeared from the Anti-Comintern Pact on which the alliance of Germany, Italy and Japan rested. Poland is confirmed in its long held view that disinterested help from Russia was a mirage. The British Dominions and the United States of America, still free to think for themselves, can have no illusions left about the overwhelming strength of Great Britain's case in face of a desperate statesmanship suddenly reduced to making a left-about face. These implications of the new situation are present to the mind of the normal British business man who, in any circumstances, is the last individual to think of crying before he is hurt.

The need to keep a cool head is the more important because of the palpable dangers of the European situation. The Government has done exactly what was expected of it by brushing aside the Russo-German Non-Aggression pact with the declaration that it in no way affects this country's obligations to its friends. The summoning of Parliament for a special session was to be expected and its expression of a united national will can hardly fail to make a deep impression on world opinion. It was probably inevitable that Parliament should be asked to pass into law as a matter of urgency the Emergency Powers (Defence) Bill.

This measure confers on the Government the widest powers immediately to take whatever further measures may be necessary for the safety of the realm if the occasion should arise. This is our old friend "Dora" re-christened, and the business world, having had experience in the last War of her eccentricities, will keep a close eye on her. The fussy meddlesomeness of 1914-18 must not be repeated, for if that period taught the nation one lesson more than another, it was the vital importance in the national interest of maintaining intact the industrial and commercial structure.

The men to do that are not Civil Servants old or new, but the industrialists and business men who know their jobs by heart and who are able to meet the inexorable demands of the Treasury. The Government can make no better contribution to a national effort than by giving the utmost possible freedom to everyone to get on with his allotted task.

This principle is indeed implicit in the Civil Defence programme which has lately been necessarily exercising the minds of firms and individuals up and down the country. *The Times* in a recent leading article very properly emphasised that air raid precautions could never be a substitute for ordinary activity, but its background. The first duty of the British public in an emergency is unquestionably to carry on. Not only is it its first duty, but it should be its last duty as well. Fortunately, but in keeping with the British character, there has not been the slightest evidence of panic during the last few days.

The nation is prepared for any eventuality and is quietly confident of its strength. It still refuses to believe that war will be the outcome of the present commotion and will unreservedly support the honourable settlement of outstanding questions, which is the desire of the overwhelming majority of mankind.

> *"The Government remain of opinion that there is nothing in the difficulties that have arisen between Germany and Poland which would justify the use of force, involving a European war with all its tragic consequences.*
>
> *"As the Prime Minister has repeatedly said, there are indeed no questions in Europe which should not be capable of peaceful solution if only conditions of confidence could be restored.*
>
> *"His Majesty's Government are, as they always have been, ready to assist in creating such conditions, but if, in spite of all their efforts, others insist on the use of force, they are prepared and determined to resist it to the uttermost."*
>
> —*Extract from a statement issued by the Cabinet on Tuesday evening.*

NOTES AND COMMENTS

Containers

THIS issue of THE CHEMICAL AGE is devoted primarily to the subject of containers, and it is hoped that it will be of service to the many executives in the industry who purchase or use these necessary articles. Containers may be of infinite variety ranging from the storage tank holding thousands of tons, through the tank wagon in which ten tons or so of products are conveyed by rail or road, down to the humble vessel which contains but a gallon or less. They may be of every conceivable pattern from the severely utilitarian barrel or can to the exquisite, artistically-designed container for pharmaceutical products or beauty preparations, the function of which is not only to contain but to sell by its attractiveness. The money expended on containers will naturally be the minimum per unit of product contained. The gas industry can afford to spend upon holders and the oil and chemical industries upon storage tanks, and upon road or rail tank wagons which are treated with care, far more than can be spent upon containers that are used purely for packing and that may suffer maltreatment in transit. If the package is non-returnable, then, of course, the very cheapest type would be used consistent with proper performance. Quality is as important in this field as in any other, for if the container fails, the labour and money of the manufacturer are expended in vain.

Disturbing Influence of Chemical Industry

THAT the chemical industry is a disturbing influence upon the course of most other industries was the view expressed in a remarkably interesting address recently given to an audience of American business men by Mr. Francis J. Curtis of the Monsanto Company. The address was entitled: " The impact of Chemical Development on Business Policy." Mr. Curtis began by pointing out that the development of the chemical industry in the last twenty years has been so phenomenal that " we can hardly believe it ourselves and we spend most of our time wondering what is going to happen next." The chemical industry touches so many different industries in so many different places that its changes have a profound meaning for all who are engaged in manufacture. He emphasised, however, that although the fruits of chemical research and enterprise had been so marked there was no need for alarm even among those business men who were not in a position to understand the technique of the changes that were continually occurring as the result of the impact of chemistry upon industry, provided that there was continual preparedness to adapt policy to change. The lapse of time between a successful scientific experiment and its industrial realisation is considerable, and gives ample time to foresee the shadow of coming events. Production by nitrogen fixation in 1922, for example, was negligible. By 1928 the production had reached 25,000 tons a year and by 1930, 135,000 tons.

Development of Processes

MOREOVER, in spite of all the research and efforts expended upon manufacturing processes chemical prices remain reasonably stable and Mr. Curtis told his audience that: " Nothing is going to come up and hit you on the head *if you keep your powder dry.*" Nevertheless, sudden changes do occasionally happen and Mr. Curtis himself quoted plastics statistics as an instance of this. During 1929 to 1932 production measured in millions of pounds was stable at 33, 30, 34, and 31. In the next four years, however, the production suddenly soared to 45, 90, 131 and 162 millions of pounds per year respectively, i.e., the production was multiplied fivefold in five years. In general, this was brought about by lower prices due to lower cost of operating and cheaper phenol, and to the development of new plastics of higher price, but of superior quality and adaptable for new uses. Our natural resources of coals, metals and oils, are being used at an astronomical rate and in Mr. Curtis's view, " one of the largest problems that science will have to solve is the gradual transfer of our civilisation from dependence upon fossils to living on annual crops." It is perhaps a strain upon the English language to describe metallic ores as " fossils," but at least the meaning is clear. Plastics are expected in the fullness of time to take the place of metals, and it is pointed out that we can already manufacture some plastics from the products of annual crops. Another example of a rather sudden change is rayon. From the dawn of history up to yesterday, mankind had but four fibres—cotton, wool, linen and silk; now he has an abundance of artificially manufactured fibre due to the chemical industry.

Industrial Aliphatic Chemistry

ANOTHER example of the impact of chemistry upon industry quoted by Mr. Curtis was the recent development of the chemical treatment of petroleum. The whole of organic chemistry can usually be divided into two parts; the aromatic, which is based largely on compounds derived from coal tar and which had a huge development in the nineteenth and early twentieth centuries; and the aliphatic which had little development apart from a few substances such as alcohol and acetic acid. Now in America, and probably in the future in Russia and Rumania, has come huge progress in the field of aliphatic chemistry, which in itself is fully as large and will be as important as industrial aromatic chemistry. Unfortunately, the U.S. Census Bureau does not give a clear picture of those organic chemicals derived entirely from petroleum, but it does give the tonnages of those made outside coal tar. In 1929 organic chemicals of this type amounted to 30,000 tons, in 1934 they had risen to 55,000 tons, for 1937 they are 120,000 tons. " Which of us," asked Mr. Curtis, " would have believed 20 years ago that compounds with " exotic " names such as ethylene gylcol, methyl ethyl ketone, triethanolamine, and ethylene dichloride would be cruising around the country in tank car quantities."

Future Prospects

AMONG the changes which American chemists foresee in the future are the displacement of oil for transport by gas or by producers using solid fuel; this, of course, is only a European development at the moment. Another prospect is the increased use of plastics for building and for many other purposes. The replacement of woven fabrics by cellophane may not be practical at the moment, but Mr. Curtis believes that it is on the way. Perhaps the most striking conclusion is that agriculture is about to pass into the factory stage. If one considers almost any industrial manufacture and reflects how far the manufacturer would get if he had as little

control over his production as has the agriculturist over the growth of his crops and flocks, one is led to the conclusion that some drastic changes may well occur in agriculture, especially if agriculture in some of its forms is to provide the metamorphosed chemical industry of the future with its raw material. We know already that soil is unnecessary for the growth of plants. Given the proper chemical elements, water, air, and light remarkable results can be obtained under controlled " factory " conditions. When to this is added recent and future developments in fertiliser research, balanced diet for animals, and food preservation, it is evident that new fields are being opened and one must agree with Mr. Curtis that: " Leaving things to chance no longer pays."

Emission of Hydrogen Sulphide at Coke Ovens

THE Alkali Inspector's report again draws attention to the escape of hydrogen sulphide which occurs from the final coolers when gases, leaving the saturator in the direct and semi-direct systems, are cooled before the benzole plant by direct contact with water. Out of 81 coke oven installations inspected, no less than 35 now recover ammonia by washing with water in the gas works indirect system and with these works the problem does not arise. Of the other 46 works 32 cool directly with water and 14 have adopted a new system of indirect cooling by tubular condensers. There seems to be no reason why tubular condensers should not be used in new works, but the coking industry generally believes that there is little or no ground for complaint except possibly when the works is situated within the boundaries of a town. Direct cooling after the saturator, which the Inspector calls " shock cooling," dates from the early days of the coke oven industry when huge quantities of naphthalene were wont to be precipitated with the cooling water in direct plants where the gas had not previously been cooled. For some reason that is not quite clear, this method was perpetuated in all plants. The fact is that to-day it is an anachronism except in the comparatively few plants which still use direct ammonia recovery, where it may be necessary. There is no indication in the Inspector's report that the fact is recognised that direct cooling may be necessary.

Problems of Dust Deposition

THE Alkali Inspector refers to the many problems that call for attention in connection with dust production at cement works and makes the suggestion that one of the small works should be told off to act as a research centre for the purpose. It is a curious fact that means which have proved useful at one works are frequently found to be without value when applied to another works. No two works are identical in all respects and differences in behaviour must be due to slight differences in construction or operation of the kiln or in the raw materials used. Complaints alleging objectionable smell from cement works are occasionally received. These are probably due to hydrogen sulphide which is likely to be produced if the air supply is unduly restricted. Such a state of affairs is easily rectified by the adjustment of combustion conditions, but there are instances where hydrogen sulphide or other unpleasant gases are produced by dissociation of the raw materials itself. The dissociation may occur at a point in the kiln where the temperature is insufficient to secure combustion and the gases therefore pass away unburnt to the chimney.

Letters to the Editor

" Big Battalions "

SIR,—In replying to my previous letter, Miss Ball says that it is difficult to see in what way the small business unit plays a more important part than the big concern in our economic life. The answer is that there are hundreds of small units for every large one, and that they conduct the greater part of the trade of the country. It was recently estimated that in the United Kingdom alone there are not less than 600,000 concerns employing labour, of which I suppose not sixty would be classed as " big battalions " in the sense that the term was used by Lord McGowan.

While agreeing that cut-throat competition is undesirable, I believe that its extent has been greatly exaggerated and that, to-day, trade associations have done much to eliminate such abuses as price-cutting. But fair competition promotes enterprise, and increases the volume of goods and services available to the community. To give a simple instance, if publishing became a monopoly—and some large units are now virtually monopolies—one can foresee the elimination of several of the trade journals which at present afford the chemical industry a healthy variety of news and views from week to week. In that case, besides the loss to the reader, there would be less employment in the printing and publishing trades which, of course, contribute to the national well-being.

The suggestion that the value of small private enterprises " lies only in their ability to grow into big battalions " shows that your correspondent has completely missed my point. I am not merely concerned with economic efficiency, though a strong case can be made for the small as against the large unit in this respect. My chief concern is with the human factor: we must preserve at all costs the conditions under which as many people as possible can have responsibility, can exercise initiative, can stand on their own feet. Liberty is not just a matter of economics but of the soul.—Yours faithfully,

Bradford, J.B.
August 22.

Research in Canada

Utilisation of Waste Natural Gas

THE twenty-first annual report of the National Research Council of Canada, which has just been issued, deals at length with activities in the division of chemistry.

It states that one of the most striking pieces of research during the year relates to the utilisation of waste natural gas. It has been found that by heat treatment in a furnace of a special but nevertheless simple design, the fraction of waste gas known as stabiliser gas can be made to yield three to four gallons of liquid motor fuel of the benzol type per 1,000 cu. ft. of gas. The striking result has now been secured that the residual gas from such heat treatment will yield six to seven pounds of carbon black. This combination process seems to have attractive commercial possibilities. A distillation column has been developed that is of great interest to the oil-refining, synthetic chemical and coal-tar industries, as well as to other industries using distillation as a process.

The work on magnesian products in the laboratories has been very profitable to Canada. The magnesian products laboratory has not only made available to the Canadian metal industry better refractories, and a greater range of them, but it has shown that these can be produced from Canadian materials. An investigation of various domestic barks as sources of tannin for the leather industry has been carried on in the leather laboratory. In the rubber laboratory much has been done on the bonding of rubber to metal, including particularly the application to the manufacture of motor car engine mountings of a bonding material previously developed in the laboratories.

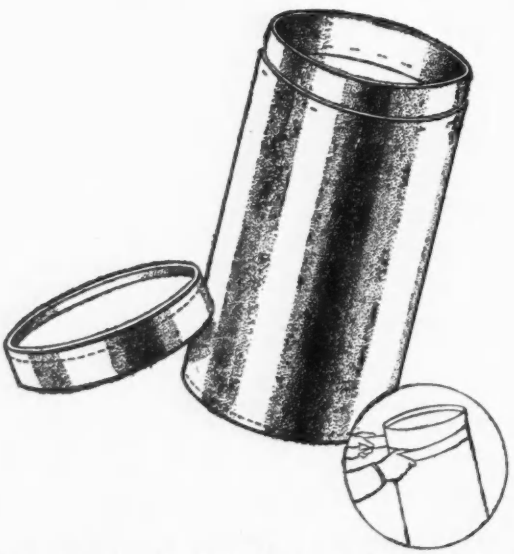
CONTAINERS
For Transport and Storage of Chemicals

By
A. G. WRIGHT

NOW that chemical products are used in so many widely different directions in industry the problem of selecting the right container has come well to the forefront. But even though immense attention has been given to this subject it is still difficult for anyone to say whether ideal conditions have yet been reached in the matter of the distribution of chemicals from the manufacturer to the user. Moreover, just what constitutes the ideal container is a matter of opinion, weighed in one direction or other by experience, and manufacturer, merchant, transport agent and user all have their own particular views to express.

Conditions for the distribution of chemicals vary with the nature of the chemicals and the manner of being handled at the user's works. There are liquids, light powdery materials, crystal products which may be dry or moist, stiff and soft pastes, materials which are difficult to pack and to remove, corrosives and non-corrosives, and products with prominent fire hazards or fumes; in fact there are numerous individual characteristics which have to be considered from the point of view of safe transport as well as easy and rapid transport, with the attendant difficulties or easiness of filling the container and emptying it. There is no doubt whatever that the makers of different classes and types of containers have done much towards achieving the ideal, and that patterns and methods have been devised which leave little cause, if any, for complaint. Metal, wood and plywood, fibre, glass, textiles and paper have all been pressed into service, each with their own objects to achieve and each suitable for the transport and storage of material of some definite nature. Intricate problems of design have also had to be solved, both from point of view of manufacture and general utility as well as in the matter of cost of manufacture—cost being important where the containers are non-returnable and this cost must be added in with the price at which the chemical is supplied to the user.

The wooden barrel or keg, which is perhaps the oldest form of container for anything in the nature of a chemical, still survives in spite of its many competitors. Tight constructions are made for liquids and slack constructions for solids, the latter being applicable for powdered, granular or lump products. The slack barrels are made with either plain or tongued and grooved edges to the staves, the latter giving a slightly greater protection against sifting, although plain stave barrels will remain extremely powdertight if properly constructed and the hoops are well driven down. Users should take the precaution of seeing that the points of the hoop nails do not extend right through the wooden staves, and so become liable to tear the internal paper liners. Hoops which are prick-punched to hold them in place are not so effective as hoops which are nailed in the correct fashion.



The all-fibre "Unotainer," made by Uno Products, carrying weights up to 112 lbs., is attractive, light, strong, safe, sift and pilfer proof and is ideal for chemicals and powders. The lid is easily sealed with adhesive tape or paper, neatly and simply.

As the bilge of the barrel increases in size, the strength of the barrel as a container decreases; this should be taken into account where the conditions of transport are severe, although much can be done to give increased strength by the grade of wood which is used for the staves, and the gauge and width of the iron hoops as well as the number of hoops employed. The position of hoops in relation to the bilge is also important from point of view of strength, but this is a matter of concern to the maker for technical reasons. Different methods of reinforçing the heads are offered, the most common method being found in the use of wooden battens applied in a direction at right angles to the direction of the head piece, and fastened by nailing through the head hoops or by special cleats.

The D.R.T. type steel drum manufactured by Fredk. Braby and Co., Ltd. This drum can now be supplied with a lacquered inside surface to protect the contents from contamination or discoloration by the steel.

It has been mainly due to the introduction of automatic bag packing machinery that multi-wall paper bags are now finding favour for powdered and granular products. Only those who have used this form of package, or have been the consignees of chemicals so packed, can fully realise the exceptional strength which is offered against transport abuses. An outstanding consideration which applies to the adoption of the paper bag as a container is whether or not the physical and chemical properties of the product permit the use of automatic machine weighing and filling. Where packing must be done at a high rate there is no doubt that the paper bag offers great advantages, especially as it can be obtained as a pre-closed or valve type made especially for automatic filling machinery, as well as the open-mouth type which can be filled and closed by sewing or in some other approved manner. Hydrated lime, soda ash and fertilisers are typical of the materials for which multi-wall paper bags are advantageous, and under exceptionally rough conditions of handling large users report that the breakage is well under one per cent., and, moreover, it may be noted that the large amount of cement which is handled in this manner ably testifies to the general efficiency of the paper bag where the nature of the product permits usage.

While the sales department wants a container which will please the customer, the manufacturing side of the business desires one which is relatively inexpensive and which will prove easy to fill and close, and store as well as handle. At the same time the container must be one which allows advantages in freight, so far as it can be stacked without waste of storage space, and also one for which there will be a minimum of claims for damage in transit. It is due to this complexity of the problem of the storage and transport of chemicals that it has been difficult to evolve the ideal, apart

from the fact that the ideal has been very closely approached. Each case must be considered on its own merits, or individually, and no doubt a close approach to the ideal can be obtained by striking a balance of desirable features between the difficulties of the chemical manufacturer in respect of filling and sealing the container and those facilities which are offered the user with regard to storage, handling about the works, and opening and emptying. It is for this reason that the most useful information can be gained by visiting the works of large consumers of a particular product to see the conditions of storage, handling and using which apply or are favoured. Use of the correct form of container, whilst giving good service in transport, then becomes a matter of service to the user of the chemicals if quantities supplied by the manufacturer or merchant justifies it.

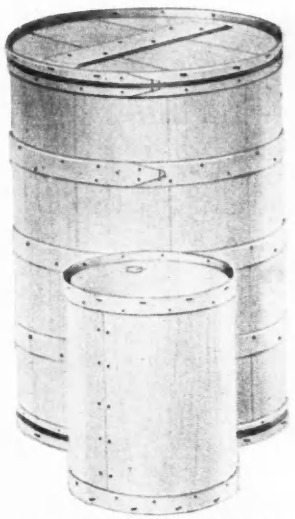
There are many directions in which the makers of different types of containers have set out to give better service to the users. For instance, great strides have been made in the construction of fibre drums, which can provide very good moisture resistance and are able to withstand very rough handling, in addition to which they are notably effective for preventing the contamination of the product which is packed with proper commonsense precautions. In connection with the use of barrels and bags, loose crêpe paper liners have been introduced to allow stretching in all directions and so increase the resistance to tearing, simultaneously with an improvement in moisture resistance. Drums made of wood veneer have been improved in the matter of construction to allow reduced cost of production and to give greater strength in handling as well as a package which defies sifting of contents or ingress of foreign material likely to cause contamination. With regard to steel drums much has been done to improve the method of making the seams and means for closing and opening the drum; linings have also been developed to allow steel drums to be used for the transport of chemical products which normally react with steel to detriment of purity. Returnable steel drums of heavier construction have been provided with better rolling hoops and more satisfactory spuds and plugs. The returnable drum, of course, was first introduced by reason of the demand for safe transport of certain dangerous products, refinements of construction from point of view of safety becoming too expensive to limit the usefulness of the drum to a single journey. With advantages in cost, as apportioned per journey for the life of the drum, the use of such drums has been extended to many products that are not dangerous.

A "non-returnable" drum made by the Valor Co., Ltd., incorporating a new dome top. It is of the easy-pour type and is available in 5-gallon size.

A circular taper neck transport can also made by the Valor Co., Ltd. It is constructed in 20-gauge lead-coated steel, with body corrugated for strength, and fitted with 3-in. non-screw bung and leather washer.

The metal drum, which is easy to fill and easy to empty, provides a very convenient and safe method of transport. Moreover, it has been modified in construction wherever necessary to meet all conditions of handling. Such drums are no longer used exclusively for liquids and semi-fluid products; they also find favour for powders, because leakage is reduced to the absolute minimum and both the deterioration of the product as well as contamination is guarded against. Different conditions of transport are satisfied by a range of strengths resulting from the use of different thicknesses of metal. Light gauge metal provides for a convenient drum to meet the needs of a single journey between the supplier of the product and the user. Heavier metal allows the making of a returnable drum, which can make many journeys and by re-conditioning may prove to have exceptionally long life.

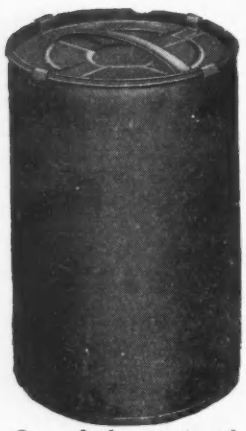
The so-called non-returnable drum, made of light gauge metal, has a special outstanding advantage in that it provides a convenient means for storage in actual transport packages at the user's works, and this advantage increases when a long period of storage is involved. The user of the chemical has satisfaction in knowing that it is packed in a form which can be emptied as and when needed and will meanwhile be kept in perfect condition as regards purity or any physical or moisture conditions of quality. Simultaneously the supplier of the chemical products is relieved of the additional book-keeping concerned with charging and crediting the return of the empty drums, but still more important from a financial aspect there is no locking up of capital in drums which are not giving actual transport service continuously throughout the year. Just where the advantage of returnable and non-returnable types changes over from one to the other must be determined by the supplier of the chemical products, with due regard to the nature of the chemicals, the average length of journey and the length of time the drum will take to return ready for refilling. Conditions of handling during transport will be found to vary considerably, and may prove a far-reaching factor in determining the life of the drum, but construction can always be modified to meet this. Perfect leak-proof joints in the case of an all-welded drum insure against the loss of a liquid, however small that loss may be, and this should be borne in mind from the hazardous aspect as well as short delivery.



Two examples of cylindrical casks made by the Guelph Cask Veneer and Plywood Co. Ltd. Veneer-stave casks are supplied either in sturdy, light or in intermediate strengths, in various styles and with different types of linings; if necessary, casks of plywood, in capacities from ½ to 47 gallons.

For the convenience of their construction, non-returnable drums are made almost exclusively of the true cylindrical shape with equal diameter from end to end, or "straight-sided." The returnable drum, on the other hand, may be of equal diameter from end to end, or with a "bilge" or maximum diameter midway between the two ends. This true barrel shape facilitates the turning of direction when the drum is being rolled about and placed in some desired position for temporary storage; the drum with a bilge is also more easily turned up on end when full. For the truly cylindrical drum two or more rolling hoops have to be provided to make the task accomplishable, but there is nothing in the ordinary construction to make it easy to alter the direction of rolling other than experience. For the drum with a bilge there is a definite stiffening of the body due to the arched construction, and consequently a greater resistance is offered against severe blows during transport. Rolling rings may be pressed from the body of the drum or preferably provided in the form of I-shaped metal; the former construction is usually adopted for the non-returnable type, which can also be provided with corrugations over the greater part of the body length to give the maximum strength for the gauge of metal employed.

In approving a particular pattern of returnable drum care-



One of the range of P.T.L. kegs, made by F. Robinson and Co., Ltd., for paint, powder and semi-liquids.

ful inspection should be made of all seams, to see that they are of a type which will withstand bad handling when in use. The filling and emptying holes must be sufficiently strong and well and rigidly fixed to avoid any distortion in the act of tightening or loosening the screw plugs; weakness around the spud or socket gives a risk of wrenching it from the body of the drum, or at least putting the weld under considerable strain with leakage at this point sooner or later under the stresses of subsequent journeys. All-welded sides and end seams provide the greatest degree of being leak-proof; if the end seams are caulked it is well to be cautious in adopting such a drum for crevice-seeking oils and spirits, and even for any liquid it is well to inquire the nature of the material used in caulking.

For the non-returnable drum the metal must be sufficiently strong to withstand one journey, but it must be remembered that this journey may be a long one and there may be the need of loading and unloading several times in the course of it. If the gauge of the metal is too heavy there is increased cost in actual metal and also in extra difficulties of manufacture. Particular attention in the matter of inspection should be given at the ends or heads, because any weakness here will cause the drum to burst open if it is dropped heavily. General appearance cannot always be expected to be high, due to cost, but the finish should not fall below a desirable level for the quality of the product which the drum transports. Naturally, the desire to produce a non-returnable drum at the lowest possible price tends to avoid certain minor refinements, but all seams and joints should reach a definite level in strength and efficiency as regards liquid tightness.

Emptying holes which are provided at one end of small drums should be placed as close to the edge as possible so that the contents of the drum may be poured out without loss and that the drum may be completely emptied. A drum should always be capable of being emptied "to the last drop" without difficulty. It is for this reason that large drums which are usually emptied from a hole on the side, should not have the spud projecting into the interior more than necessary to make a strong welded joint, unless holes are drilled in the spud at the level of the interior surface of the metal body to allow the drainage of liquid. It is true, of course, that such large drums are most conveniently emptied by the assistance of a syphon of some similar device to give easy control of the flow of liquid, but even so there are occasions when the drum may need to be washed out and drained from the empty hole and improper construction may make this difficult.

Where metal drums are used for powdered products, the so-called "full open" head is far preferable to all others, because it is easier to clean the entire interior surface and there is greater ease and assurance in emptying the drum. There are, however, various types of quick opening and re-sealing constructions, with a hole of smaller diameter than that of the head of the drum, which have particular advantages where certain products may be handled and needed at regular intervals in relatively small quantities compared with the full storage capacity of the drum.

In a drum of the returnable type the joint around the filling or emptying hole is usually one of the first places to show signs of failure. Length of life considered generally can be greatly increased by frequent repainting of the exterior surface to afford the maximum degree of protection against weather conditions. Perfect drainage will also increase length of life, as it avoids serious corrosion internally; the small amount of corrosive liquid which may remain in an "empty" drum does far more damage than the bulk of corrosive liquid which may have been transported. Different conditions of corrosive action upon the internal surface can be counteracted by the provision of a special interior surface, such as a "baked on" coating, but the possible or suggested need of a special interior surface is often put out of question by taking a little more care in selecting the particular steel of which the returnable drums are to be made.

A new type of drum, suitable for oils, recently put on the market by Tanks and Drum, Ltd.

The great diversity which is possible in the capacity and shape of metal cans for liquid chemical products is one of their outstanding advantages. These can be cylindrical, with conical tops, or square in cross-section, with pyramid-like tops; the two types are better spoken of as sound and square "tapers." The square taper, by comparison with the round taper, offers an advantage in floor space saving, the whole of the floor space in a railway wagon or road lorry being utilised with regard to the total quantity of liquid carried, and the four flat sides of the can can often be utilised to better advantage than the curved surface of the round body can for the purpose of displaying the name of product and manufacturer. The tapered tops of these metal cans, of course, make it easier to remove the contents either completely or in small quantities, but there is an additional advantage in preventing the cans being stacked one layer upon another with consequent risk of bursting open the seams of those in the lower layer by the superimposed weight.

Bauxite Cement

A New Process of Manufacture

NATURAL bauxite is found in abundant quantity in many parts of India, but the manufacture of bauxite cement has not yet been taken up. Gopal Chatterjee draws attention (*Indian Ceramics*, 1939. *1*, 20-21) to some experiments on it with locally available raw materials that have been made at the Hindustan Potteries, Ltd., Behala, and the Jhaja Cement Works by Mr. K. C. Roy Choudhury, who has invented a process of his own for producing bauxite cement of remarkable strength by calcination or sintering of a mixture of lime and ground ferruginous bauxite after subjecting the mixture to a pressure of 800 lb.

His invention is based on the discovery that intimate chemical combination of lime with alumina or bauxite takes place at low temperatures, *viz.*, below 1,100° C., in an ordinary furnace or kiln. Advantages of this process are:—(1) capital cost is low; no expensive rotary kilns are required for vitrification of Portland cement mixture or high efficiency blast or electric furnace is necessary for fusion of lime-bauxite mixture; (2) the unit may be as low as 10 tons per day or 3,000 tons a year; (3) use of steam coal instead of the expensive hard coke; (4) use of impure bauxite or laterite available in many places in Bihar and Central Provinces; and (5) use of unskilled or semi-skilled labour only.

INCREASING attention has been devoted in Germany recently to finding means for the practical utilisation of sewage. It is estimated that approximately 3.6 million cubic metres of waste water enters German municipal sewage systems daily and since this water contains considerable amounts of plant food elements the economic utilisation of the latter has been attempted.

TRANSPORT OF LIQUIDS BY ROAD

Development of Tank Wagons

THE use of containers, for the carriage of goods by road, has increased considerably during the past few years, but it is probably correct to say, that the most striking development in this direction, has been in the conveyance of liquids of all kinds in road tank wagons.

Road tanks were first used in the days of horse-drawn vehicles, but the development of the internal combustion engine brought in its wake an ever-increasing need for the conveyance of petrol in large quantities. Petrol, being highly inflammable, could only be landed at certain places and regulations were brought into force dealing with its carriage and store.

Effect of Regulations

These regulations, which are still in force, cover any liquid with a flashpoint below 73° F. Briefly, their effect is to limit the total capacity of the vehicle to 2,500 gallons, divided into self-contained compartments not exceeding 600-gallons, although in actual practice 500-gallon compartments are generally used. The tanks also have to have special manhole covers and outlet cocks, and a firescreen behind the driver's cab. There are certain other requirements which have to be borne in mind, both in regard to the chassis and tank. With a few minor exceptions, these are the only regulations which affect the conveyance of liquids in road tank wagons, but they have had a considerable bearing on the construction and development of tank wagons. For many years most of them were constructed for carrying petrol whether or not the liquid they were to carry had a flashpoint above 73° F.

With the increase in technical knowledge and the search for economy in the cost of distribution and manufacture generally, it was realised that many other liquids could be carried in bulk. As these other liquids are not inflammable, they do not require special tanks, and it has been possible to simplify the construction to a large degree. Although there are no regulations it is, of course, necessary to have regard to the nature of the material to be carried, its specific gravity, its degree of viscosity, and, most important, the effect of the liquid on the material of which the tank is constructed.

Later, the range has been increased to include materials which are generally used in liquid form, but at normal temperature are solid. By insulating or lagging the tank so that it will retain heat it is possible to carry these materials in a liquid state, and deliver them to the manufacturer ready for instant use. Storage tanks for petrol were all placed underground so that unloading was by gravity and pumps were not used nor fitted to the vehicles. Overhead storage tanks are more suitable for the majority of liquids used in manufacturing processes, so the latest tank wagons are fitted with pumps or compressors both driven off the engine and capable of delivering the load to the required height. For use with a compressor, the tank has to be specially tested to withstand double the working pressure, but for use with a mechanical pump, this is not so essential.

The simplest form of tanks in use are of mild steel not lagged. These range in capacity from 500-gallons to 3,500-gallons. Whether the larger tanks can be fully loaded depends on the specific gravity of the liquid as the total gross weight of an eight-wheeled vehicle and the load must not exceed the 22-tons laid down in the Road Traffic Act, 1933.

Among the liquids carried in this type of tank are methylated spirit, power methylated spirit, methanol, butyl and ethyl alcohols and acetates, cresylic acid, coal tar naphtha, creosote oil, and various solvents. The conveyance of these liquids does not present much difficulty provided always that the tank is properly cleaned after each load. If some of these chemicals are carried in proper rotation, even cleansing is not necessary. The majority of them could equally well be carried in aluminium tanks by which means a considerable saving in weight could be effected. This is an important factor in road transport at present, but against that, the cost of construction is higher than for a mild steel tank of similar capacity. However, aluminium tanks have an additional advantage in that there is no rusting of the tank such as there is with the mild steel tank, even with the presence of a small quantity of water in the load. In certain cases, before being used for carrying dutiable spirit, the designs of the tanks, including arrangements for locking the outlets and manholes, have to be approved by H.M. Customs and Excise.

Mild Steel Tanks

Plain mild steel tanks, provided they are fitted with suitable cocks, are also used for carrying caustic soda liquor, crude glycerine, silicate of soda, potassium silicate, concentrated sulphuric acid and ammonia solution. In actual practice, when carrying caustic soda liquor over long distances, it has been found advisable to use lagged tanks to prevent any possibility of the loads crystallising during very cold weather. Lagged tanks are also used for carrying crude glycerine and silicate of soda as otherwise during a spell of cold weather, they would become so viscous as to delay the unloading and possibly render the transport uneconomic. Concentrated sulphuric acid is normally safe in mild steel tanks, but the more diluted it becomes, the more it attacks the metal. Even washing out the tank after the load is sufficient to set up corrosion.

Hydrochloric acid is entirely different in its action and can be carried in rubber lined tanks with ebonite cocks, while glass lined (vitreous enamel) tanks can be used for nitric acid. Glacial acetic acid over 60 per cent. strength can be

A 3,000 gallon insulated tank used for transporting caustic liquor, silicate of soda, etc.

A 3,000 gallon mild steel insulated tank and mechanical pump for carrying glycerine, solvents, etc.

carried in liquid form when heated, but requires still another type of tank. Either special stainless steel or 98/99 per cent. aluminium is used, and in addition the tank must be insulated as the liquid will solidify at a temperature of 65° F. Exactly the same kind of tank can be used for carrying acetic anhydride. Another chemical requiring the use of a stainless steel or aluminium tank is formaldehyde, but in this case insulation is not necessary. Acetone, when moved in bulk, is generally carried in aluminium tanks as even the smallest amount of rust is considered sufficient to spoil the load. Aluminium tanks are also used for carrying distilled water when this is required in large quantities. The high degree of cleanliness required is obtained by steaming the tanks.

The manufacture of common soap calls for the use of large quantities of crude vegetable and other oils, such as palm oil, palm kernel oil, coconut oil, tallow, whale oil, which, while used in a liquid state, solidify, some at as high a temperature as 90° F. For the carriage of these liquids, mild steel tanks fully insulated, are generally used. The oils are heated, in some case as high as 150° F., before being loaded, and in 24 hours there is normally not more than a 10 per cent. fall in temperature. Jacketed pumps, heated from the exhaust, are fitted to many of these vehicles to facilitate discharge, especially during the winter.

Tanks of this kind have to be steamed at frequent intervals to prevent hardening of the drainings in the sump and round the outlet cocks. To facilitate cleaning, the tanks are built as far as possible without baffle plates, with as large compartments as possible and with easily removable manhole covers. Very similar tanks are used for carrying molasses, coal tar, and bitumen, except that they are generally fitted with steam coils in addition to the insulation and compressors instead of pumps for unloading.

Other crude vegetable oils such as linseed oil, soya bean oil, perilla oil, cottonseed oil, china wood (tung) oil, used in the manufacture of paints, varnishes, disinfectants, and other processes, are carried in mild steel tanks. With the exception of tung oil, they do not solidify as do the other vegetable oils. Insulated tanks are not necessary for their conveyance, but if used have an advantage during the cold weather in preventing too big a drop in temperature during transit.

Within the last few years increasing quantities of refined deodorised vegetable and other oils used in manufacturing

The tank of this vehicle has a capacity of 1,000 gallons and is aluminium insulated with mechanical pump.

edible products have been moved in tank wagons. When dealing with foodstuffs absolute cleanliness is essential and for this reason stainless steel tanks, insulated with "Alfol," are used for conveying these oils. The tanks are welded and the metal descaled so that there is a smooth bright surface. Steam is used for cleaning, as this not only removes any traces of fat left in the tanks, but sterilises them as well. They are then wiped out with sterilised rags as the presence of water must at all costs be avoided.

This article does not cover all the chemicals and liquids which are, or could be, carried in tank wagons, but it does show some of the developments which have taken place during the last few years. This method of transport undoubtedly offers many advantages. Against the initial cost of installing storage tanks which, incidentally, can be built overhead, thus saving ground space and also giving gravity feed into the manufacturing plant, there are avoided the cost of barrels or drums, the carriage on the tare of these containers, their cooperage, and liability to waste through leakage

Suitable for carrying refined deodorised oils this stainless steel insulated tank has a capacity of 3,300 gallons.

Aluminium

Solution Potential Studied in Presence of Various Gases

A STUDY of the solution potential of aluminium in the presence of various gases has been reported to the French Academy of Sciences by Mlle. Goldowski. She notes that the results obtained by different investigators differ, and ascribes this to the fact that the metal examined is always covered with a more or less thin layer of a composition which will depend on the nature of the atmosphere in which the metal is placed.

In her investigations she used pure aluminium (99.99 per cent.) from which a cylindrical test piece was cut, and immediately covered with insulating varnish. An area of about 5 sq. mm. of the surface of this piece was then cleaned of varnish, using a diamond and working in the presence of the gas with which the aluminium was to be tested. The cleaned surface was left in the presence of the gas from five to ten minutes and the metal then immediately plunged into an electrolyte for measurement. Contact with the air is only for a fraction of a second, so that its influence was neglected. The measures were made by determining the difference in potential between the aluminium and a calomel electrode in a one per cent. solution of sodium chloride. The differences measured are: Air, 0.720 to 0.820 volts; dry oxygen, 0.825 V; moist oxygen, 1,000 to 0.700 V; dry hydrogen, 0.650 to 0.575 V.; dry carbon dioxide, 0.750 V.; sulphur dioxide, 0.500 V.; ammonia, 1,000 to 0.550 V. It would seem that there are two superficial alterations of the metal. The first occurs when the aluminium absorbs the gas with which it is in contact, forming a more or less stable superficial coating either by physical or by chemical means. The second alteration occurs through the attack of the electrolyte on this superficial coating. It would seem, therefore, that it is not possible to obtain the solution potential of a metal in an electrolyte except if the metal has not been in contact with the air at all, not with any other gas, before the measure is made.

It is reported that the Standard Oil Co. of California is considering plans for the erection of an oil refinery in Australia, probably at Sydney. The refinery would deal with oil from Al Khobar, on the Persian Gulf side of Saudi Arabia. Economic and other conditions were against an expensive refinery in Arabia.

AIR TRANSPORT

Increasing Use by Chemical Industry

MANY firms with trade interests overseas have found in recent years that air transport provides an undoubted stimulus to business—a facility enabling not only rapid personal contact over distances of hundreds and thousands of miles, but in many cases the means of drastically reducing the time taken in delivery of products.

Without air travel, executives and technicians would be involved in very protracted and time-wasting journeys, particularly in travelling to and from remotely situated mineral mines, chemical workings, and similar enterprises abroad.

It was realised some time ago that with the establishment of air travel on a normal routine basis, many British firms with interests far afield would send their representatives regularly by air. Imperial Airways therefore introduced a "bulk travel" scheme, which gives useful economic advantages to frequent air travellers.

According to a travel expert, although air travel is at first sight more expensive, it is actually cheaper in many cases. For example, on a journey to India, he calculates that the saving in business time by a £1,000 a year man easily outweighs the extra cost of air travel. Apart from considerations of business time, however, there are many instances of a business tour by air having cost less than would have been the case by first-class surface transport. This was the experience of a group of South African business leaders who recently toured Europe by air.

London officials of enterprises carried on abroad can visit these centres of exploitation in a fraction of the time previously necessary. Conversely, managers and technicians abroad can return home for consultation with a frequency that was not possible before air travel reduced a journey of weeks to one of days.

As far as the dispatch of products by air is concerned, the chemical industry, while not a large air transport user, is showing an increasing disposition in this direction. There are, of course, some chemical products which are debarred from aircraft. Imperial Airways are glad to advise on the suitability of chemical preparations for dispatch on their European and Empire services. They issue a list of chemicals which cannot be carried, and this prohibition extends to any form of combustible material flashing under 73° F. Broadly speaking, chemicals are not accepted which are inflammable, corrosive, or which have an obnoxious smell.

Fine chemicals, small in bulk and of considerable value, frequently go by air. There have, however, been instances of very heavy chemical lots being carried. A gramophone factory near Calcutta had to close down for a time last year owing to a breakdown in the air-conditioning plant. In response to an urgent cable to England, no less than three hundredweights of refrigerant were carried by Imperial Airways' flying-boat to Calcutta in three days. The stoppage at the factory was thus reduced to a few days.

Among the miscellany of chemical products which are regularly air-borne, are carbon rods and powdered carbon, dye-powders and considerable quantities of bicarbonate of soda. There are frequent examples of such fine chemicals as insulin being rushed abroad by aeroplane in emergency cases. Some weeks ago supplies of the new drug Dagenan, a pyridine derivative of sulphanilamide, were flown to Rome by Imperial flying-boat to alleviate a case of acute blood poisoning.

Manufacturers of fine chemicals send supplies by air practically every day, not only to European cities, but to countries of the Empire. Firms who fulfil these emergency orders have a special organisation to deal with air consignments. Cables from abroad are immediately telephoned by the cable company, prior to the delivery of the cable.

To take another aspect of the relationship between aviation and chemistry, it might be worth mentioning that Imperial Airways have made a special study of the problem of eliminating the risk of disease-bearing insects being carried from one part of the tropics to another in the company's aircraft. There has been evolved a system of disinsectising aircraft in flight by the use of a portable vaporising machine, which permeates the atmosphere with pyrethrum insecticide. The insecticide issues from the vaporiser in such fine form that the entire atmosphere is soaked with an invisible mist, innocuous to everything except insect life, and causing not the slightest discomfort to passengers or damage to the aircraft fittings.

Loading freight on to an Imperial Airways' flying boat.

It is certain that the global network of regular air-lines—to which an historic addition this month (August), is the inauguration of Imperial Airways' Atlantic air-mail service—will play an ever more important part in the movement of commerce. One can visualise giant air freight expresses of the future being employed in international trade exchanges of all kinds.

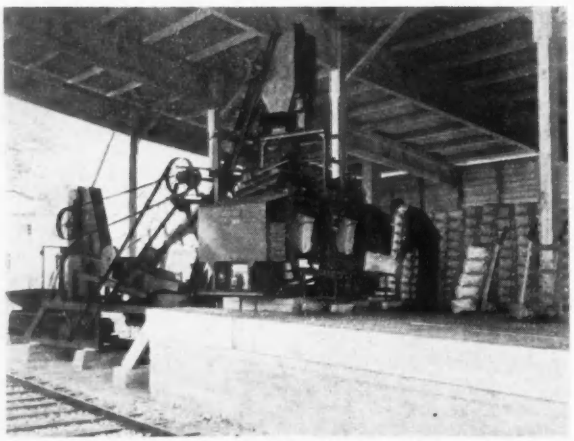
The following are among the products prohibited for carriage on Imperial Airways' services:—Acteone, acetylene, acids (except citric and tartaric), ammonia, ammonium sulphate, benzine, carbon bisulphide, carbon dioxide, celluloid and similar substances, calcium carbide, camphor oil, camphine, chlorate of potash, chlorate of soda, collodion, cordite, ether, explosives of all kinds, fulminating powder, hydrogen peroxide, kerosene, naphtha, sodium peroxide, nitrate of soda, nitro-glycerine, calcium nitrate, pyridine, paraffin (liquid petroleum and its products excepting when used for fuel and contained in tanks provided for the purpose), phosphorus, saltpetre, varnishes containing spirit. Any form of combustible material flashing under 73° F.

New Packing System

Clapper Bags for Chemicals

AN interesting new system for the packing of chemical products, such as fertilisers, in paper bags of the valve type, has been evolved in France by an engineer, Alfred Dubois. The system is known as the Gravitas system, and employs a machine which permits, for the first time, the use of clapper bags for such products. It is essentially to permit the advantages of this type of bag to be extended to products other than powders, such as cement (which has been packed in this type of bag for several years) that this machine has been built.

The product to be packed is fed to the machine through a hopper in which it is prevented from sticking or bridging by any suitable method. In the machine itself, this result is



A "Gravitas" filler installed in a fertiliser plant.

obtained by vibration. From the main feed hopper, the product falls into a small hopper, ending in a rather large diameter spout, set at an angle. The bag to be filled is slipped over this spout, and rests on a scale plate which forms a rest for it. The small hopper, the spout and the bag holding plate form a unit which is constantly vibrated during filling by a small electric vibrator, which not only assures an even flow of material through the spout, but shakes it down into the bag, packing it firmly.

Weighing of the contents is carried out on the principle of the beam scale, the small hopper, spout, bag and plate being connected to one end of the scale beam, while the desired weights are hung on the other end. When the scale is tipped, this automatically cuts off the flow of product to the small hopper, and as soon as this has had time to empty (a matter of a second or two) the bag is removed and an empty one put in its place. Closure of the bag takes place merely by folding in the valve flap.

Obviously this machine can be used for substances other than fertilisers. It is designed to handle any sort of lumpy or sticky product, which cannot be forced through a horizontal tube without great difficulty or damage.

A REMISSION of half the road tax to users of "producer" gas, instead of petrol, is being recommended to the Australian Government by the Federal Minister for Supply and Development. "Producer" gas, the use of which has lately been discussed in England, is made from charcoal, wood, or other solid fuel, in a generator carried on the vehicle itself. The Federal Government is approaching the various State Governments, to see what can be done to reduce the licence fees for vehicles which use the gas. Australia, at present, uses 300 million gallons of motor spirit a year. Most of it comes from the Dutch East Indies. For 30 years, a search for oil in Australia, has been going on, but so far, no payable deposit has been discovered. The Government is now taking steps to conserve supplies in case of war, and to encourage the use of other fuels.

Benzopyran Derivatives*

Probable Mechanism of Production

SEVERAL natural products, such as the insecticides deguelin, tephrosin, and toxicarol have been shown to possess two benzopyran ring systems in their structures; a dihydrozenzopyran system and a dimethylbenzopyran system. In order to determine whether simple benzopyran derivatives possessed insecticidal activity, the preparation of a series of 2, 2-dialkyl-1, 2-benzopyrans was studied.

One method for the synthesis of these benzopyran derivatives consisted in treating coumarin with alkylmagnesium halides. It was necessary not only to establish the structure of the products of this reaction, but also desirable to obtain information concerning its mechanism and to extend the synthesis to other substituted coumarins.

Treatment of coumarin with an excess of the alkylmagnesium halides was found to produce the desired 2, 2-dialkyl-1, 2-benzopyrans in yields ranging from 59 per cent. for the dimethyl to 91 per cent. for the di-*n*-heptyl derivative. The physical properties of the compounds were found to be gradational throughout the series and all the molecular refractivities indicated that the double bond of the pyran ring was conjugated with the benzene ring. The formation of salicylaldehyde by ozonolysis also shows that the double bond was in the 3, 4-position and hence the two alkyl groups in the 2, 2-position. Catalytic reduction produced 2, 2-dimethylchroman, the physical properties of which checked those given by Claisen (*Ber.*, 1921, *54*, 200).

Treatment of coumarin with one mole of the Grignard reagent produced an addition compound which would regenerate coumarin by decomposition with ammonium chloride solution or could be converted to a benzopyrylium salt by treatment with concentrated hydrochloric acid. It was also found that *o*-hydroxybenzalacetone underwent 1, 4-addition upon treatment with methylmagnesium iodide to produce 2, 4-dimethyl-1, 2-benzopyran as the final product. These experiments establish the fact that the formation of 2, 2-dialkyl-1, 2-benzopyrans by the action of alkylmagnesium halides on coumarin does not involve opening of the lactone ring. It seems probable that the initial product of the reaction is a co-ordination complex between coumarin, alkylmagnesium halide, and ether. An α, γ-shift of the alkyl group in this complex would yield an intermediate which could be converted by means of hydrochloric acid to a benzopyrylium salt. The complex could react with a second mole of alkylmagnesium halide to yield the 2, 2-dialkyl-1, 2-benzopyran.

In contrast to the behaviour of coumarin it was found that *trans* coumaric acid reacted with methylmagnesium iodide to produce *o*-hydroxybenzalacetone. Treatment of the latter with methylmagnesium iodide produced 4-(*o*-hydroxyphenyl)-2-pentanone, a reaction which involved 1, 4-addition. Dehydration of this ketone, followed by ring closure yielded 2, 4-dimethyl-1, 2-benzopyran.

α-Naphthocoumarin reacted with methylmagnesium iodide to give a 55 per cent. yield of 2, 2-dimethyl-1, 2-(α)-naphthopyran and a 16 per cent. yield of the phenolic ketone, 4-(2-hydroxy-1-naphthyl)-2-pentanone. The latter compound dehydrated and underwent ring closure to give 2, 4-dimethyl-1, 2-(α)-naphthopyran.

* From an abstract of a thesis submitted by Alvin G. Sharp, for the degree of Doctor of Philosophy in Chemistry at Illinois University.

THE German authorities are planning an intensified cultivation of linseed as one means of overcoming Germany's shortage of fats and oils. Only 1,400,000 tons, out of a total demand of 2,400,000 tons, can be produced at home. An increased use of linseed oil would help to meet the shortage. In 1878 Germany produced 67 per cent. of her needed linseed supplies. To-day she produces only 8 per cent. By offering higher prices for linseed the Ministry of Agriculture hopes to stimulate its cultivation.

New Technical Books

BOILER FEED WATER TREATMENT. Second edition. By F. J. Matthews. Pp. 319. London: Hutchinson's Scientific and Technical Publications. 12s. 6d.

The purpose of this book is to provide the operator of the small "ordinary" plant with some guidance to the wide variety of treatment now available, and with a view to assisting rapid reference and lessening confusion, the information is presented in articulate form.

A fair amount of revision has been necessary in this edition, to include new plant constructional features and also to meet revised views on problems such as caustic embrittlement, carbonate and phosphate conditioning, the mechanism of scale formation, priming and production of wet steam, etc. A considerable amount of new additional matter has also been included on the subjects of silicate scale, hydrogen and demineralising zeolites, colloidal conditioning, use of metaphosphates, etc. A section is devoted to analysis, including the usual routine methods of testing required for the efficient operation of softeners. A selection of references is also given for those interested in the full details of individual investigations and subjects.

THE WAR GASES. CHEMISTRY AND ANALYSIS. By Dr. Mario Satori. Translated by L. W. Marrison. Pp. 360. London: J. & A. Churchill, Ltd. 21s.

Our present knowledge of most of the asphyxiating gases is very superficial, and even inexact, which is the reason that while some merit the importance given to them, others tend to be overvalued. This book has been published with a view to providing information concerning the constitution, the methods of preparation and the properties of these substances.

Particulars are given concerning sixty-four gases, details of the preparation in the laboratory and on the manufacturing scale, the physical properties, the chemical reactions, the action on the human organism, and methods of destruction.

ORGANIC CHEMISTRY. By Paul Karrer. Translated from the latest German edition by A. J. Mee. Pp. 902. Amsterdam: "Elsevier."

The first English translation of Karrer's "Lehrbuch der Organischen Chemie" is based on the fifth German edition, but the corrections and additions to the sixth German edition have been incorporated. The aim of the original edition was to provide students with a textbook of organic chemistry of medium size, which would give them a survey of the ever-increasing body of facts. To make the problems of organic chemistry more easily understood, and to make the subject more real and live, special attention has been paid in all chapters to the description of methods of synthesis, and of determining the constitution of organic compounds. The methods of producing the majority of the compounds dealt with and the proofs of the constitution and configuration are thoroughly discussed, particularly the problems of stereochemistry. The arrangement of the subject has been determined only by didactic considerations.

USES OF LAC. By H. K. Sen and S. Ranganathan. Pp. 78. Indian Lac Research Institute. Re. 1/4/-.

This booklet is a brief answer to the large number of inquiries from officials such as directors of industries and forest officers, private manufacturers and industrialists, received by the Indian Lac Research Institute, requesting information regarding the possibility of increasing the uses of lac and shellac in India. The subject-matter is largely a compilation of materials published in recent technical scientific books and journals.

It has been estimated by competent dealers in shellac that the total annual consumption of lac in India is about 18 to 20 thousand hundredweight. There would thus appear to be a potential expanding market for shellac consumption in that country, with its progressive industrialisation, especially in view of the many useful properties of shellac, the application of which have been by no means fully explored.

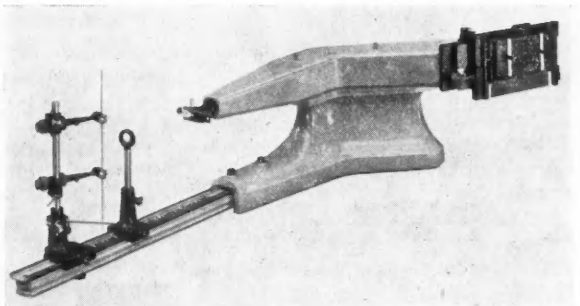
Recent Trade Literature

NEGRETTI AND ZAMBRA have issued a leaflet dealing with a gauge for fan-testing which conforms to British Standard Specification No. 848-1939. An inclined tube-gauge, it has a range of 0/1½ in. water, bore of inclined limb, not less than 0.2 in. in diameter, an adjustable silvered brass scale, divided at 0.01 in. water with longer lines at 0.05 in. and 0.10 in. The scale is approximately 15 inches long, pitot tubes for use with the gauge are solid drawn brass tubing, nickel-plated.

THE THERMAL SYNDICATE, LTD., have issued a leaflet dealing with gas immersion heaters. Many users of acid baths in pickling and plating, etc., heat by gas and would use immersion heating if they were sure of adequate resistance of the heater to corrosion. The Vitreosil Gas Immersion Heater has been developed by the company for such work. The envelope is of Vitreosil, pure fused silica, resistant to acids, except hydrofluoric, at all temperatures up to 1,100° C.

ADAM HILGER, LTD., describe and illustrate their latest instrument, a Barfit medium quartz spectrograph (E. 498), in a recently-issued leaflet.

This instrument has a number of improvements over earlier models, of which the chief are: the optical system is made to new computations, which have resulted in greatly improved design; the image field is quite flat, and first quality definition is obtained over the whole spectrum; the base of the spectrograph is constructed to take a Hilger standard accessory bar, on which a number of accessories can be



mounted; the position of the plate-holder is controlled by a worm-gear, the operating handle of which is conveniently used; by a new geometrical device which eliminates slides and grooves the plate-holders drop into position very conveniently and accurately; the dense glass prism and lenses, E. 408, can be quickly and conveniently interchanged with those of quartz, without unscrewing any lens cells. The company have also issued a folder dealing with "Specpure," ratio quantitative substances for quantitative spectrochemical analysis. These substances are highly purified, and have been prepared and standardised for use in the method of quantitative spectrographic analysis advocated and described by Dr. S. Judd Lewis (*Chemistry and Industry*, 1932, *15*, 271-274; "Spectroscopy in Science and Industry," Blackie).

ROSE, DOWNS AND THOMPSON, LTD., have issued List No. 35, dealing with their wide range of scrap metal baling presses, with accompanying hydraulic pumps, etc. For some years now the manufacture of equipment for the baling or bundling of heavy and light iron steel scrap, such as shearings, slippers, swarf, sheet iron, waste tins, cans and bins, has formed one of the company's foremost specialities. The list illustrates a number of presses manufactured by the company in operation at various factories, and also the various types of hand-operated, power-driven and hydraulically-driven balers, with various types and sizes of hydraulic pumps and accumulators. The company has also issued List No. 33, which is a further section of their general oil-mill catalogue. This describes, with suitable illustrations, the various types and sizes of steel kettles, or cookers, manufactured by them for carrying out one of the essential operations in the process of oil-milling in the extraction of vegetable oil.

Polymerisation of Acetylene

Catalytic Formation of Mono- and Di-Vinylacetylenes

AN account of recent work on acetylene polymerisation for production of the mono- and di-vinyl derivatives, catalysed with weakly acid solutions containing ammonium and copper chlorides is given by Schmitz and Schumacher (*Zeit. of Elektrochem*, 503-17). Reference to previous work in this field includes that of Carter and associates, described in *J. Am. C.S.*, 1931, *53*, 4,197, and U.S.P. 2,048,838 In the present case the process was continuous, and the pressure and temperature limits were 1 to 2½ atmospheres and 60° to 110° C. respectively.

It was first of all determined that the rate of flow of the acetylene is a material factor, since, when this increased, the partial pressure of the acetylene and therefore also the yields of polymers are also increased. The proportion of DVA (divinyl-acetylene) falls at first with increasing rate of flow, but above a certain limiting rate it only varies, like the total yield, very slightly. By increasing the area of contact the total yield, is augmented while the proportion of DVA falls. Yields with individual catalysts are proportional to the partial pressure of acetylene above the solution.

Solubility Measurements

By means of solubility measurements it was found that the amount of acetylene dissolved at temperatures over 60° is also proportional to the acetylene pressure; therefore also the yields of polymerisate are proportional to the amount of dissolved acetylene. Increasing the ammonium chloride concentration markedly reduces solubility of acetylene in the catalyst mixture; however, at constant acetylene concentration in the solution the final yields are not affected by increasing ammonium chloride concentration.

Within the limits determined by conditions of test the yields, with constant acetylene concentration, are proportional to the copper chloride concentration. The proportion of DVA increases with temperature at constant rate of flow of acetylene and with the copper chloride concentration in the catalyst solution. The addition of an effective solvent for the MVA (mono-derivative) to the catalyst is without effect on the yield and ratio MVA : DVA. The removal also of the last traces of MVA with cold activated charcoal from the circulated acetylene is also without effect on this ratio. The replacement of ammonium chloride by ammonium bromide considerably reduces the yield, probably owing to formation of copper bromide which is less active than the copper chloride.

Tests were made with additions of carbon monoxide, vinyl chloride, and formaldehyde to the acetylene, without effect on the yields; and similarly with ferric chloride. In using as catalyst a mixture of copper chloride, pyridine, and acetic acid there was considerable polymerisation other than to MVA and DVA.

A UNITED STATES' official report gives the imports by Sweden of chemical products as $41,800,000 in 1938, an increase of three per cent. over the 1937 figures. The value of the imports during the first three months of the current year amounted to $14,000,000 and showed a gain of eleven per cent. over the imports for the corresponding three months of 1938. The United States' share in Sweden's chemical import trade averages about eight per cent. of the total. For some products, however, American manufacturers enjoy a large share of the total Swedish trade. Practically all the rosin used in Sweden's important paper industry comes from the United States. About 50 per cent. of Sweden's requirements of turpentine originate in the United States. Imports of American sulphur, metal working and textile compounds are increasing steadily. Other chemical and related lines which Sweden imports from the United States, include heavy chemicals, paint products, medicinals, pharmaceuticals, soaps, toilet goods, dyes and fertilisers.

India's Chemical Imports

A Small Decline

ACCORDING to a survey of the import trade of India for the year April 1, 1938, to March 31, 1939, published by the Department of Overseas Trade, there was a small decline in the aggregate imports of chemicals and chemical preparations (excluding manures and medicines) from Rs.3,33 lakhs to Rs.3,06 lakhs.

The imports of individual products compared with the previous year's figures are shown in the following table:—

	1937-38 Rs. (lakhs)	1938-39 Rs. (lakhs)
Acids	10.39	11.05
Aluminous sulphates	1.38	1.11
Anhydrous ammonia	2.83	2.00
Muriate of ammonia	3.96	3.52
Carbonate and bicarbonate of ammonia	1.71	2.02
Other ammonia and salts thereof	1.45	1.49
Arsenic and its oxides	1.17	1.18
Bleaching powder	13.12	12.49
Calcium Carbide	5.94	6.36
Liquid chlorine	2.49	2.12
Copper sulphate	5.53	4.25
Disinfectants	8.21	5.75
Glycerine	1.07	1.97
Lead compounds	0.90	0.64
Magnesium compounds	4.53	3.08
Phosphorus, all kinds	1.10	1.22
Potassium bichromate	1.44	1.03
Potassium chlorate	7.07	5.38
Other potassium compounds	3.49	4.66
Sodium bicarbonate	5.60	4.84
Sodium bichromate	4.65	3.40
Borax	3.61	2.99
Sodium carbonate	59.58	61.44
Sodium cyanide	2.19	1.49
Caustic soda	42.80	45.07
Sodium hydrosulphite	13.98	7.17
Sodium silicate	1.82	1.55
Sodium sulphide	3.27	2.11
Sodium hyposulphite	0.81	0.89
Sodium sulphate	0.85	0.95
Other sodium compounds	3.20	2.63
Sulphur brimstone	26.11	21.74
Zinc compounds	13.42	11.55
Other sorts of chemicals	71.77	64.72

There was also a considerable decline in the aggregate import of dyes obtained from coal tar following the quieter conditions in the Indian cotton textile industry, from 21 million lb., value Rs.3,43 lakhs, to 12 million lb., value Rs.2,61 lakhs. Germany, as much the largest contributor to this trade, suffered the largest reduction, her sendings falling from 15 million lb., value Rs.2,50 lakhs, to 8 million lb., value Rs.1,70 lakhs. Imports from the United Kingdom declined from 2.2 million lb., value Rs.37 lakhs, to 1½ million lb., value Rs.32 lakhs.

There was some decline in the imports of aluminium from 66.8 thousand cwts., valued at Rs. 52.7 lakhs, to 57.8 thousand cwts., valued at Rs.46.3 lakhs.

NEW MINERAL DISCOVERED

The United States Department of the Interior has announced the discovery of a new mineral, officially named "shortite."

Composed of a double carbonate of sodium and calcium, the new mineral was found and identified by Mr. J. J. Fahey, a chemist in the American Geological Survey laboratory. It was discovered as disseminated well-formed crystals in sections of core from an oil and gas well, drilled in Sweetwater County, Wyoming, at depths of 1,250 to 1,800 ft. below the earth's surface. Shortite was named in honour of Dr. M. N. Short, a former geologist of the Survey who now is professor of optical mineralogy at the University of Arizona. The new mineral might be adapted to use in glassmaking and ceramics work should it ever be found in sufficient quantities.

PERSONAL NOTES

DR. G. E. F. LUNDELL, head of the chemical division of the American National Bureau of Standards, has been elected vice-president of the American Society for Testing Materials.

* * * *

DR. ALAN P. PLATT, assistant lecturer at Liverpool University in bio-chemistry, sailed on August 18 from Southampton to California, where he will undertake special study at Berkeley University for twelve months.

* * * *

DR. C. M. A. STINE, director of the American Institute of Chemical Engineers and vice-president in charge of research, E.I. du Pont de Nemours and Co., Inc., has accepted an invitation to address the Second International Chemical Engineering Congress to be held in Berlin in 1940.

* * * *

DR. WILLIAM C. PRICE, fellow of Trinity College, Cambridge, and research chemist and lecturer in chemistry at Cambridge University, has been married at Siloam Chapel, Swansea, to Miss N. M. Davies, of Swansea. Dr. Price was recently awarded the Medola Medal for being the most promising research chemist under 30 in Great Britain.

OBITUARY

MR. CORBETT WILLIAM WOODALL, chairman of the Gas Purification and Chemical Co., Ltd., and a director of the National Coke and Oil Company, died recently, aged 73.

* * * *

MR. JOHN BYRNE, who was formerly chairman of the firm of Goodlass Wall and Co., Ltd., of Liverpool, and who retired in 1931, died last week at his home in Liverpool, aged 75. He had been in the service of Goodlass Wall and Co., Ltd., for 54 years, during part of the time as secretary to the late Mr. Henry Wall, the firm's founder. He was appointed managing director in 1901.

LIEUT-COLONEL JOSEPH S. RUSTON, chairman of Ruston and Hornsby, Ltd., has left estate valued at £81,013 (net personality £10,916).

* * * *

MR. JOHN CAMERON ANDERSON, of Fettykil House, Leslie, Fife, managing director of Smith, Anderson and Co., paper makers, who died in June, left personal estate value at £45,251.

Synthetic Fibre from Soya Beans

Japanese Developments

IN *J.S.C.I.* (Jap. Sup. Bdg. 1939, 191-2B (June), Sakurada gives details of albuminous base fibres now being made in Japan, especially that made from soya bean albumen by the Showa Sangyo K.K. and sold under the name of Silkool. There is plenty of raw material, for some 5,000,000 tons of soya beans are produced on the average annually in Manchukuo, Japan, and Korea, yielding about 2,000,000 tons of crude albumen.

The whole of this is not of course available for textile purposes, but if only one per cent. is utilised in this way the supply is still considerable. Tables giving the various characteristics of Silkool, as compared with Lanital, Tiolan, etc., show that it compares favourably with these in respect to tensile strength, elasticity, etc., although the individual samples appear to differ rather widely in quality. Like the other synthetic fibres mentioned it does not appear to stand up very well against wet conditions, but the general conclusion reached by Sakurada is that it is fairly easy to obtain albumen base fibre (soya bean albumen) which has elastic properties closely approximating those of real wool.

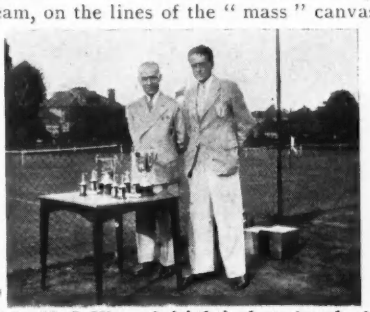
Death of Mr. H. J. Wrench

Theatrical and Business Interests

THE CHEMICAL AGE deeply regrets to announce that its London representative, Mr. H. J. Wrench, died at St. Thomas's Hospital on Tuesday, at the age of 45. He had been in poor health for some time, but seemed to be making a recovery and was in good spirits when colleagues called to see him there a week ago. On Tuesday, however, he had a sudden relapse and passed away that afternoon.

Wrench began his career on the stage, and had made a promising start when the war broke out in 1914. Among other parts he had understudied Mr. Jack Buchanan, to whom he had a striking resemblance. By a happy coincidence, during his service in France, he was for some time "batman" to Mr. A. A. Milne, the famous playwright. Some years later, when Wrench was producing plays for the Benn Brothers Dramatic Circle, Mr. Milne came to one of the performances and warmly congratulated him on the production. Wrench named his son Robin after Mr. Milne's famous "Christopher Robin."

In 1920, Wrench joined Benn Brothers Limited as one of a party of ex-Service men who went round selling subscriptions in a team, on the lines of the "mass" canvassing often



Mr. H. J. Wrench (right) photographed at one of "The Chemical Age" Tennis Tournaments.

undertaken during political elections. After this initiation "on the road," he was transferred to the advertisement department of THE CHEMICAL AGE, where his courtesy and pleasant manner soon endeared him to a wide circle of friends. The strong position of the journal among London firms is in no small measure due to the spade work and steady attention which Wrench gave to it throughout the past eighteen years.

Outside business hours, it was in the production of plays that Wrench found his greatest joy. The series began in a small way at the West Central Hall, Tottenham Court Road, and proved so successful that the New Scala Theatre was taken for "The Creaking Chair" in 1929, and henceforward till 1933 this big theatre was booked for performances of comedies and thrillers on behalf of trade charities and of the John Benn Hostel.

One of his oldest colleagues writes:—

"Those who were privileged to work under Jack Wrench in these productions remember him as a keen, vital and skilful producer. He was a born actor, but never took a part with us, his being the more difficult part of training players who were often slow to appreciate the finer points, which he brought out so clearly when he read our lines. His patience with poor material, his good humour when we flagged and perhaps became a little disgruntled with one another, made us try again for his sake. He had the keenest sense of humour, and his witty—though never cutting—criticisms were always frank and fair, were the actor director or office boy. His aim was to produce a play which was up to the very highest standard, but it was hard to get him to take a curtain at the call of 'producer,' as he was modest to a fault.

"Although the plays have lapsed for several years, the work which Wrench did has had an enduring influence on the spirit of the staff of Benn Brothers, who will always retain the happiest memories of a splendid colleague, called too early from their midst."

References to Current Literature

Inorganic

Decomposition of protoxide of iron. Bénard, ***Ann. Chim.***, *12*, 5-92.

Sulphanic acids in the separation of the rare earths. Kleinberg, Taebel and Audrieth, *Ind. Eng. Chem. analyt. ed.*, *11*, 368-369.

Treatment of water by ion-exchange. Richter, ***Melliand Textilber.***, *20*, 579-582.

Preparation of pure carbon dioxide. Dumond and Declercq, *L'Ind. Chim.*, *26*, 434-441.

Organic

Catalytic dehydration of C_6—C_8 aliphatic alcohols. Goldwasser and Taylor, *J. Amer. Chem. Soc.*, *61*, 1,751-1,761.

Isomerisation of cyclohexane. Glasebrook and Lovell, *J. Amer. Chem. Soc.*, *61*, 1,717-1,720.

Local anæsthetic from β-2, piperidyl-ethanol. Walten and Fosbinder, *J. Amer. Chem. Soc.*, *61*, 1,173-1,714.

Concentrated dextrin solutions. Höppler, *Gelatine Leim Klebstoffe*, *7*, 75-88.

Thermal dehydration of ethane to ethylene. Potolovskii and Atal'Yan, *Petroleum Eng.*, *10*, No. 11, 40-48.

Electrolysis of organic compounds with alternating current. Shipley and Rogers, *Canadian J. Research*, *17*, B, 147-158.

Phthalic esters as alkylating agents. King and Wright, *J.C.S.*, 1939. 1,168-1,170.

Analysis

Volumetric oxidation of iodide to iodate by sodium chlorite. Yntema and Fleming, *Ind. Eng. Chem. analyt. ed.*, *11*, 375-377.

Determination of lead by dithizone. Bambach, *Ind. Eng. Chem. analyt. ed.*, *11*, 400-403.

Determination of the carbon dioxide content of ammoniacal liquors. Astley and Greenwood, *J. Soc. Chem. Ind.*, *58*, 251-252.

Determination of fatty acids in soaps and washing powders. Liebetanz, *Seifensieder Z.*, *66*, 467-468.

Analysis of olive oil. Martinenghi, *Fette u. Seifen. 46*, 333-337.

Analysis of hydrocarbons. Grosse-Oetringhaus, *Petroleum Z.*, *35*, 567-573.

Determination of coke and volatile matter of solid fuel. Rodmacher, *Fuel*, *18*, 228-246.

Mineral Oils, Gas, Tar

Splitting of ozokerite at ordinary pressure in presence of aluminium chloride. Otin and Cotrutz, *Petroleum Z.*, *35*, 561-567.

Examination of light petrols. Hammerich, *Oel u. Kohle*, *15*. 569-577.

Vapour detectors in the petroleum industry. Docksey, *J. Inst. Petroleum*, *25*, 449-455.

Trends in lubricating oil manufacture. Fitzgerald, *Petroleum Eng.*, *10*, No. 10, 105-110.

Cellulose, Paper

Alkaline decomposition of beech wood. Jayme, Wagenbach and Deloff, *Papier Fabrik. (techn. Teil)*, *37*, 229-235.

Drying. Herdey, *Wochenblatt f. Papierfabrik.*, *70*, 557-562.

Bleaching, Dyeing, Finishing

Mercerisation of cotton-staple fibre mixtures. Kollmann, *Seide u. Kunstseide*, *44*, 228-231.

Mechanical-technical properties of staple fibres. Breuer, *Kunstseide u. Zellwolle*, *21*, 242-246.

Casein fibre. Heim, *J. Text. Inst.*, *30*, P213-223.

Behaviour of staple fibres on scouring. Elod and Wittmuss, *Melliand Textilber.*, *20*, 571-577.

Glass, Ceramics

Adherence-promoting oxides in ground-coat enamels. Kautz, *J. Amer. Ceram. Soc.*, *22*, 250-255.

Absorption of moisture by ceramic bodies. Rigby, *Trans. Brit. Ceram. Soc.*, *38*, 411-417.

Delayed crazing. Wood and Hind, *Trans. Brit. Ceram. Soc.*, *38*, 435-454.

Metals, Electrometallurgy

Colouring processes for zinc alloys. Schlerit, *Metallwirtsch.*, *18*, 549-550.

Hot galvanising. Thalemann, *Metallwirtsch.*, *18*. 555-560.

Corrosion and protection of magnesium alloys. *Light Metals*, *11*, 274-276.

Electrolytic galvanising. *Metallwaren. Ind. u. Galvano-Tech.*, *37* 337-338.

Anodic coating of aluminium. Edwards, *Amer. Electroplaters' Soc. Monthly Rev.*, 1939, 513-532.

Working up of ores poor in iron. Wentrup, *Chem. Ztg.*, *63*, 513-516.

Fats, Oils, Waxes

Continuous extraction of seeds. Hildebrandt, *Fette u. Seifen*, *46*, 350-352.

Artificial wood oils. Blom, *Peint. Pigments Vernis*, *16*, 118-120.

Cooking of synthetics. Faucett, *Paint Oil Chem. Rev.*, *101*, No. 14, 7-10, 30.

Continuous extraction method for unsaponifiable matters. Rogers, *Oil and Soap*, *16*, 127-128.

Zinc white in the soap industry. Foulon, *Chem. Products*, *2*, 97-98.

Oil of lemongrass. Guenther, *Soap*, *15*, No. 7. 26-29; No. 8, 28-31, 69.

Paints, Pigments

Emulsion binders and blenders, Hebberling, *Farbe u. Lack*, 1939, 291-292.

Manufacture of the lime greens. Rücker, *Farbe u. Lack*, 1939, 315-316.

Simple methods of testing putty. Zeidler and Schuster, *Paint Varnish Prod. Manager*, *19*, 212-218.

Improved method of grinding paints. *Paint Varnish Prod. Manager*, *19*, 226-229.

Mould growth. McLachlan and Floren, *J. Oil Col. Chem. Assoc.*, *22*, 180-193.

Rubbers, Resins, Plastics

Highly polymeric artificial plastics for cables and conductors. Nowak, *Kunststoffe*, *29*, 192-194.

Artificial resins as base exchange substances. Richter, *Kunststoffe*, *29*, 195-197.

Oxidation test for rubber. Dufraisse, *Rev. Générale Caoutchouc*, *16*, 168-171.

Resistance of chlorinated rubber. Hoekstra, *Kautschuk*, *15*, 108-112, 137-140.

Running Congo copal. Hellinckx, *Paint Techn.*, *4*. 235-237.

Synthetic rubber and elastic polymers. Starkweather and Youker, *Ind. Eng. Chem.*, *31*, 934-939.

Miscellaneous

Extraction of liquids with solvents. Thormann, *Chem. Apparatur*, *26*, 201-208.

Laboratory distillation columns. Jantzen and Haker, *Chem. Fabrik*, *12*, 329-331.

Advances in filtering and pressing processes. Waeser, *Chem. Fabrik*, *12*, 353-357.

Cyclone dust collectors. Shepherd and Lapple, *Ind. Eng. Chem.*, *31*, 972-984.

Action of filter aids. Carman, *Ind. Eng. Chem.*, *31*, 1,047-1,050.

General News——From Week to Week

THE LADYWASH lead mine, near Eyam, Derbyshire, is to be re-opened. The mine was closed about 20 years ago.

DURING the first half of this year chemicals, carrying Key Industry Duty, imported into the U.K. were valued at £617,362, against £474,144 during the same period last year.

THE ANNUAL MEETING of members of the North of England Institute of Mining and Mechanical Engineers will be held in the Lecture Theatre of the Institute, Newcastle-upon-Tyne, this (Saturday) afternoon.

THE PRICE of imported soya beans having fallen, the Treasury, on the recommendation of the Import Duties Advisory Committee, has reduced the rate of drawback on soya beans used for the manufacture of soya bean oil and flour.

A RICH SEAM OF BARYTES has been struck by the Caldbeck Mines, Ltd., at their new mine on the Caldbeck Fells, Cumberland. The mine is now producing about 100 tons of high grade washed barytes weekly with a single shift, and big developments are contemplated in the near future.

A REPRESENTATION has been made to the Board of Trade under Section 10(5) of the Finance Act, 1926, regarding Metaxylene. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, before September 22, 1939.

THE INSTITUTE OF EXPORT have issued a complete set of gummed diary reminders of seven separate series of meetings dealing with the process and technique of export trade, which the Institute has arranged for members from October to the end of the year. The reminders comprise gummed slips, containing details of each meeting, which can be detached and inserted in diaries.

A SERIES of courses lasting seven weeks in anti-gas action and fire-fighting will be started at the end of the month for employees of all factories on the Team Valley Trading Estate, to whom the National Defence Act applies. A comprehensive scheme of air-raid shelters is now being worked out for this estate, where there are 101 factories in production employing some 4,000 people.

THE NEW SESSION of the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3, which extends over about 36 weeks, will begin on Monday, September 25, and students will be enrolled on and after September 20. The Institute provides evening instruction in pure and applied mathematics, physics, chemistry, biology, bacteriology, brewing, petroleum, technology, fuel technology (including coal carbonisation and gas engineering), chemical engineering, metallurgy, assaying, geology, etc.

AN EVENT of far reaching importance in the colour-using world has recently taken place by the decision of all the producers for the locknit trade that it will be in the interests of the trade if fewer colours are featured in their ranges and if one card is adopted by all firms. This means that such firms as British Celanese, Ltd., Courtaulds, Ltd., Lansil, Ltd., and 50 others using viscose, acetate and Bemberg yarns, will not issue separate colour ranges in future. A committee was appointed under the auspices of the Rayon and Silk Association to consider the production of such a card for the spring in co-operation with the British Colour Council.

AN AGREEMENT has been signed between John Thompson (Dudley), Ltd., the well-known manufacturers of plant for the chemical, foodstuffs and beverage industries, and Mr. Francis Jaray, 66 Victoria Street, London, S.W.1, who holds the rights to sell and apply "GaShell" lining materials, throughout the British Empire. "GaShell" has been in use in the brewery, wine and cider industries for ten years on the continent, but has only recently been introduced into this country. It is used for the lining of all kinds of containers such as steel tanks, ferro-concrete tanks, wooden vats and casks. By this agreement, John Thompson (Dudley), Ltd., are granted the exclusive rights for the British Isles, to manufacture and sell "GaShell" lined steel tanks. They undertake not to sell glass-lined tanks in future. Mr. Francis Jaray, who will do the actual lining for John Thompson (Dudley), Ltd., will, of course, continue to line, *in situ*, concrete tanks, vats and casks and will also continue re-lining worn or damaged glass-lined tanks.

GERMAN AND ITALIAN scientists will be among the 200 delegates from all parts of the world who will attend the five-day conference in London next week of the International Society of Leather Trades Chemists.

IT IS REPORTED that Welsh manufacturers have received large orders for tinplates from Spain, and also from South America. Home orders also remain good, and the prospects for the remainder of 1939 appear satisfactory.

AN ANALYSIS of industries now located at the Treforest Trading Estate, in the Special Area of South Wales, shows that the tenants include eleven chemical manufacturers and thirteen light engineering and metal products manufacturers. The tenants now number 100, half of whom are in production. Many of the factories are working night and day.

THIRTY-ONE EXHIBITORS of chemicals have already applied for 11,896 sq. ft. of space in the British Industries Fair at Olympia next February as against a final allotment in this year's Fair of 23 exhibitors for 9,783 sq. ft. of space. All told, at Olympia and Earl's Court applications from 856 exhibitors have already come in for 456,775 sq. ft. of space.

THE BRITISH ALUMINIUM CO., LTD., will be removing their head office from Adelaide House, King William Street, London, E.C.4, to new and larger quarters at Norfolk House, St. James's Square, London, S.W.1, as from September 18, 1939. The telephone number will be Whitehall 7822 (private branch exchange); telegraphic address, "Cryolite, Piccy, London," and cables, "Cryolite, London." The new office will be the registered address of the company.

A FURTHER STEP in the development of the Scottish oil industry at West Calder was taken last week when the first sod was cut of the new shale pit to be sunk at Westmains. The new pit will be only a short distance from the colliery which supplies the various oil works with coal. It is expected that it will take about a year to sink the shale field. The new shale mine at Hermand, West Calder, is being developed, and an electric plant is being installed there. Workmen have also started to prepare for the erection of the new oil works at Westwood.

THE FORCING OPEN of a vulcaniser door by compressed air caused the death of an employee of R. W. Stewart and Co., Dunfermline Rubber Works, last week. The accident occurred on the night shift. After loading the vulcaniser with a quantity of rubber shoes, deceased was in the act of closing the heavy door of the machine when for some unknown reason it suddenly flew back, striking him a tremendous blow, and dashing him against a wall. It is presumed that there was compressed air in the compartment at the time as the air had not been turned on.

AN IMPORTANT REFERENCE to possible developments in the search for oil in Nottinghamshire is made in the quarterly report of the Mansfield and District Employment Committee. The secretary, Mr. W. F. Eddowes, states: "The results of the new oil developments may have an important bearing on the industrial future of Mansfield district, especially as regards the extension of industry towards Ollerton and Bilsthorpe. The Eakring No. 1 well has been sunk and oil has been found in what is believed to be workable quantities at a depth of 1,975 feet. This well is producing oil at the rate of about 100 tons a week. It is understood that a number of new borings are contemplated, and an extension of the work may be looked for in the near future."

A REPRESENTATION has been made to the Board of Trade under Section 10(5) of the Finance Act, 1926, regarding cyclohexylamine. Section 10(5) of the Finance Act, 1926, indicates that the Treasury may by order exempt from duty "any article in respect of which the Board of Trade are satisfied on a representation made by a consumer of that article that the article is not made in any part of His Majesty's dominions in quantities which are substantial having regard to the consumption of that article for the time being in the United Kingdom, and that there is no reasonable probability that the article will within a reasonable period be made in His Majesty's Dominions in such substantial quantities." Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, before September 13, 1939.

THE 1938-39 EDITION of the Statistical Year-Book of the League of Nations has just been published. The statistical tables, carefully kept up to date, relating to the territories and populations of all countries in the world and to the natural movement of those populations, are of very general interest. The statistics of production, consumption, trade, exchange rates, and public finance—to mention only a few subjects—will be of special interest to commercial, industrial, and financial circles. The Year-Book as a whole is a very useful work of reference for anyone wishing to study many of the serious problems which are at present disturbing the world.

Foreign News

THE ANNUAL consumption of carbon bisulphide in Turkey is reported to be about 150 tons. Italy supplies the bulk of the material.

POTASH EXPORTS by Palestine Potash, Ltd., amounted to 20,648 tons, valued at £123,887 for the first quarter of this year, against 13,910 tons valued at £83,460 for the same period in 1938.

A PRODUCER-GAS, burning green timber, is being used by an inventor to operate a stationary engine at a timber mill at Naitikup, Western Australia. Another plant of the same design is operating a motor truck for hauling logs to the mill. A patent was taken out last January. Tests, it is stated, have shown that the plant burns green or dry wood and that no gumming of valves occurs, because the process ensures clean gas. It is claimed that green wood produces a better quality of gas than charcoal.

ONE OF THE projects which has been considered by the Egyptian Government relates to the production of ferrous sulphate for treatment of public water supplies. Municipal drinking water in Egypt, obtained from artesian wells or from the river Nile, is treated with imported aluminium sulphate. There is no production of aluminium sulphate in Egypt and a plan has been considered for replacing the commodity by domestic ferrous sulphate. It is proposed to erect a factory for the manufacture of ferrous sulphate at a cost of approximately 18,000 Egyptian pounds with a capacity large enough to cover Egyptian potential requirements with a surplus for export.

INVESTIGATIONS INTO THE PROSPECTS of exploiting sand deposits in Bombay province commercially will be conducted from October next under the direction of Dr. V. S. Dubey, Professor of Geology at the Benares University. As a result of the survey, it is hoped that the glass industry in the province will not have to depend in future on the United Provinces for the supply of raw material, and will also be in a position to reduce its cost of production. The work is financed by the Government of India after sanction by the Industrial Research Council. Along with the survey of glass making materials, investigations into the possibilities of developing the ceramic industry will also be carried out.

ACCORDING TO A foreign official report, Japanese exports of synthetic dyestuffs have been maintained at record levels during the current year. During the January-April period exports totalled 5,974,300 pounds, compared with 1,859,000 pounds in the corresponding period of 1938. The sharp advance in this export during recent months reflects the resumption of activity of Japanese and Chinese textile mills in the areas in China now under Japanese control, China being by far the most important market for such products. Increased shipments have also been made to Manchoukuo and Kwantung Province during the current year. Imports of synthetic dyestuffs into Japan in the first four months of 1939, while sharply in excess of the 1938 totals, were still far below those recorded in the corresponding period of 1937.

THE PRODUCTS RESULTING FROM subjection of rosin to cracking treatment have been investigated by Brus and Brodschi (*Bull. Soc. Chim. de France*, *5*, 1605). Operating in the vapour phase in presence of various catalysts (copper, alumina, silica gel) at temperatures ranging from 500 to 700° C., three categories of breakdown products were formed: a gaseous mixture, an oil distilling between 30 and 200° C. and a heavy oil distilling above 200° C. The light oil was found to be constituted by 55 per cent. of aromatics (benzene, toluene, xylene, cumene, pseudocumene and cymene) and 45 per cent. of cyclohexadienes, the whole possessing a calorific value of 10,400 cals and an octane number of 130. From the heavy oil a number of crystalline materials could be isolated by fractional distillation, including phenanthrene, retene and anthracene.

A NEW COPPER smelting works is to be built at Sandomir (Poland) by the Tisza concern.

MANUFACTURE of fermentation citric acid has been commenced on a small scale in Riga by the Vinoza Chemical Works.

CONTINUED demand for naphthenic acids from the United States has induced the Rumanian oil industry to make plans for expanding the production of these acids.

PLANS for the setting up of a national pharmaceutical-products factory in the Argentine, have been approved by the Government, but are still to be confirmed by Parliament.

EXTENSIONS costing about £80,000 are to be carried out by Colgate Palmolive Proprietary, Ltd., to their soap factory at Balmain, near Sydney, Australia. The works' output is to be doubled.

THE NEW Industrial Research Institute established by the Egyptian Ministry of Trade and Industry, for the development of Egyptian industries which utilise domestic materials, is expected to commence operations shortly.

JAPANESE production of ethylene glycol will undergo a considerable expansion in the near future with the entry into this field of the Korean Nitrogenous Fertiliser Company and the Nissan Chemical Industry Company.

A NEW STILL capable of producing 2,000,000 gallons of alcohol annually has been imported recently by the Colonial Sugar Refining Co., Australia, and installed at its plant in Sydney. This additional capacity was found necessary in order to keep up with the increasing demand for ordinary industrial alcohol, but the new still is also capable of producing absolute alcohol for use as a motor fuel if such production should become desirable.

ACCORDING to an official announcement from Tokyo the industrial laboratory at Osaka has succeeded in manufacturing synthetic rubber suitable for industrial purposes. Finished goods made from this rubber, says the announcement, are far superior to those made from natural rubber. Articles have been made by scientists in co-operation with manufacturing plants. The new process is said to improve tyres, gasmasks, and other products. Industrialists throughout the country welcome the use of synthetic rubber in industry because of Japan's lack of natural rubber resources.

THE DEUTSCHE SOLVAY WERKE, A.-G. has, it is reported, acquired ownership of the processing plants of the Alkaliwerke Westeregeln G.m.b.H., a leading German potash concern and subsidiary of the Salzdetfurth A.G. The plants in question produce caustic alkalies, chlorine, hydrogen, magnesium chloride, potassium chlorate, bromine, bromine salts, hydrochloric acid and wood preserving agents. The output of alkalies, chlorine and chlorine products has expanded considerably in recent times. The power works for operating the chemical plants are also included in the transfer in ownership.

AN INVESTIGATION of the raw materials available in Sumatra has just been completed by the Director of the State Mines in the Netherlands who arrived in the Netherlands Indies some time ago for the purpose of making a study of the possibilities of establishing a major chemical industry in that country. It is said that two important projects, for the financing of which certain Netherlands interests are prepared to supply several million guilders, are under consideration. It is also reported that the possibility of establishing the plant in the Asahan district (Sumatra), in order that the Asahan falls could be used to supply the required electric energy, is under consideration. The investigation was made at the request of the Government of the Netherlands Indies according to the office of the American Trade Commissioner, Batavia.

OLIVE OIL production in 1938-9.—According to Mr. L. D. Mallory, of the U.S. Embassy in Paris (*Bull. des Mat. Grasses* 1939, *8*, 176-7), the corrected estimate for the season 1938-9, is 782,800 short tons, which, with the stocks previously in hand of 155,000 short tons, chiefly in Greece, Portugal and Spain makes an available total of 937,800 sh. tons. Allowing for a consumption in the producing countries of 845,800 short tons, this leaves for export a balance of 92,000 sh. tons, as compared with an average of 116,000 sh. tons for the past nine years. Following are estimates for individual countries (in 1,000 sh. tons) with 1937-8 figures in brackets: France 10 (7.7), Greece 90 (158), Italy 187 (295), Portugal 38 (107), Spain 352 (550), Jugo-Slavia 6.5 (7.2), Palestine 9.7 (8.8), Syria and Leb. 13.2 (19.6), Turkey 30 (42), Algeria 10 (17.5), Morocco 6.7 (11.4), Tunisia 27.5 (60.5), Libya 2.2 (4.4). Totals: 782.8 (1,289.1).

Weekly Prices of British Chemical Products

THE price position remains steady in pretty well every section of the general chemical market and a firm undertone prevails throughout. A fair volume of fresh spot business is reported and the usual demand for day-to-day lines is maintained. The general movement of chemicals into consumption is reported to be on a good scale, ex-contract deliveries covering substantial volumes. There is no change of any importance to record in the market for coal tar products. Toluol is enjoying moderate attention, but in other directions the volume of inquiry is small and quotations continue on a nominal basis.

Price Changes

Rises: Pyridine.

MANCHESTER.—Trade in most descriptions of heavy chemical products on the Manchester market during the past week has shown signs of recovering from the holiday dullness, more particularly in respect of movements into consumption against contracts, although it will be a week or two yet before trading conditions are back to normal. Textile chemicals are in fair demand both from Lancashire and Yorkshire users and there is a moderate flow of specifications from other consuming industries. Fresh bookings, however, have not been particularly active. With regard to the by-products the toluols and benzoles appear to be among the most active sections.

GLASGOW.—There has been an improved demand for general chemicals for home trade, but export inquiries have been rather limited. Prices continue very firm at about last week's figures.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech., glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE (see Salammoniac).—Firsts, lump, spot, £42 17s. 6d. per ton; d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

AMMONIUM DICHROMATE.—9½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £10 10s. per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £15 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. GLASGOW: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16 per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CALCIUM CHLORIDE.—GLASGOW: 70/75% solid, £5 12s. 6d. per ton ex store.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4½d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £13 per ton d/d station in drums.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. GLASGOW: B.P. crystals, 1s. 0½d. per lb; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in bags. MANCHESTER: £18 17s 6d. per ton f.o.b. GLASGOW: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, £4 12s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. MANCHESTER: White, £31; brown, £30. GLASGOW: White crystals, £30; brown, £1 per ton less.

LEAD NITRATE.—£27 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. GLASGOW: £31 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—GLASGOW: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. GLASGOW: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY PRODUCTS.—Ammoniated B.P. (white precip.), lump, 6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P., 5s. 1d.; chloride B.P. (calomel), 6s. 2d.; red oxide cryst. (red precip.), 7s. 6d.; levig, 6s. 9d.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. MANCHESTER: £49 to £55 per ton ex store. GLASGOW: £2 9s. per cwt. in casks.

PARAFFIN WAX.—GLASGOW: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. MANCHESTER: £37 per ton. GLASGOW: 4½d. per lb.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. GLASGOW: 5½d. per lb., net, carriage paid.

POTASSIUM CHROMATE.—9d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity.

POTASSIUM PERMANGANATE.—LONDON: 9¼d to 10¼d. per lb. MANCHESTER: B.P. 9½d. to 11½d. GLASGOW: B.P. Crystals, 10½d.

POTASSIUM PRUSSIATE.—6d. to 6½d. per lb. MANCHESTER: Yellow, 6d. to 6½d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. MANCHESTER: £10 15s. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.
SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts. GLASGOW: 4¼d. per lb., carriage paid.
SODIUM CHROMATE.—4½d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £8 5s. per ton for 6-ton lots d/d. GLASGOW: £1 12s. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
SODIUM PRUSSIATE.—4d. per lb. for ton lots. MANCHESTER: 4¼d. to 5d. GLASGOW: 4d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. MANCHESTER: £3 10s.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
TARTARIC ACID.— 1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1¼d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.
ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2-cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7½d. to 1s. 2½d. per lb., according to quality. Crimson, 1s. 6½d. to 1s. 8d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £6 10s. per ton, according to quality.
CADMIUM SULPHIDE.—2s. 11d. to 3s. 2d. per lb.
CARBON BLACK.—3⅜d. to 4 1/16d. per lb., ex store.
CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 11½d. per lb.
DIPHENYLGUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3⅜d. to 4⅜d. per lb.
LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.
ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1940; September, £7 5s.; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1940; £7 11s., February £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1940; September £8 2s. 6d.; October £8 3s. 9d.; November £8 5s.; December, £8 6s. 3d.; January, 1940, £8 7s. 6d.; February £8 8s. 9d.; March £8 10s.; April/June, £8 11s. 3d.
NITRO-CHALK.—£7 10s. 6d. per ton up to June 30, 1940.
SODIUM NITRATE.—£8 5s. per ton for delivery up to June 30, 1940.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9. MANCHESTER: Crude, 1s. 0½d. to 1s. 0½d. per gal.; pure, 1s. 8d. to 1s. 8½d. per gal.; motor grade 1s. 6½d.
CARBOLIC ACID.—Crystals, 6⅝d. to 7⅛d. per lb., small quantities would be dearer; Crude, 60's 1s. 7d. to 1s. 10d.; dehydrated, 1s. 9d. to 2s. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
CREOSOTE.—Home trade, 3¾d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3¼d. to 4½d.
CRESYLIC ACID.—97/99%, 1s. 5d. to 1s. 8d.; 99/100%, 2s. to 2s. 6d. per gal., according to specification. MANCHESTER: Pale, 99/100%, 1s 5d. to 1s. 6d.
NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal.
NAPTHALENE.—Crude, whizzed or hot pressed, £6 to £6 10s. per ton; purified crystals, £9 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. MANCHESTER: Refined, £10 10s. to £11 10s. 0d. per ton f.o.b.
PITCH.—Medium, soft, 26s. per ton, f.o.b. MANCHESTER: 24s. f.o.b., East Coast.
PYRIDINE.—90/140%, 14s. 6d. to 15s. per gal.; 90/160%, 11s. 3d. to 11s. 9d. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. MANCHESTER: 10s. 6d. to 13s. 6d. per gallon.
TOLUOL.—90%, 2s. 1d. to 2s. 2d. per gal.; pure 2s. 6d. to 2s. 7d. MANCHESTER: Pure, 2s. 5d. per gallon, naked.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. MANCHESTER: 2s. 4d. per gallon.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8; grey, £9 10s.
METHYL ACETONE.—40.50%, £32 to £35 per ton.
WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.
WOOD NAPHTHA, MISCIBLE.— 2s. 8d. to 3s. per gal;. solvent, 3s. to 3s. 5d. per gal.
WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—1s. 10d. per lb., for cwt. lots, net packages.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL 34/35° C.— 1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 3d. per lb.; d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100%, d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100%, d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8½d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, Aug. 23.—LINSEED OIL was firm. Spot, £27 5s. per ton (small quantities); Sept., £24 15s.; Sept.-Dec., £24 12s. 6d.; Jan.-April, £23 12s. 6d., naked. SOYA BEAN OIL was firmer. Oriental, Aug.-Sept. shipment, c.i.f., bulk, £17 10s. RAPE OIL was quiet. Crude extracted, £31 10s. per ton; technical refined, £32 15s., naked, ex wharf. COTTON OIL was dull. Egyptian, crude, £16 10s. per ton; refined common edible, £20 10s.; deodorised, £22 10s., naked, ex mill (small lots, £1 10s. extra). TURPENTINE was firmer. American, spot, 33s. per cwt.; Sept. delivery, 32s. 9d.
HULL.—LINSEED OIL, spot, £25 10s. per ton; Aug., £25; Sept., £24 15s.; Oct.-Dec., £24 12s. 6d. COTTON OIL, Egyptian crude, spot, £16 10s.; edible refined, spot, £19 10s.; technical, spot, £19 10s.; deodorised, £21 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £17, naked. GROUNDNUT OIL, extracted, spot, £23 10s.; deodorised, £26 10s. RAPE OIL, extracted, spot, £30 10s.; refined, £31 10s. SOYA OIL, extracted, spot, £25 10s.; deodorised, £28 10s. per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 39s.; first, 34s.; second, 32s. TURPENTINE, American, spot, 34s. per cwt.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

CONDENSATION PRODUCTS, ETC.—American Cyanamid Co. (United States, Aug. 18, '38.) 22958.

PROCESS FOR THE NEUTRALISATION OF FREE ACIDITY IN FATTY BODIES.—P. Ammann. 22842.

REFINING OF HYDROCARBON LIQUIDS.—Anglo-Iranian Oil Co., Ltd. (Soc. de Raffinage des Huiles de Petrole). 22783.

PRODUCTS FOR PRINTING TEXTILE YARNS, ETC.—Calco Chemical Co., Inc. (United States, Aug. 11, 1938).) 22868.

COLOURING COMPOSITIONS FOR TEXTILES.—Calco Chemical Co., Inc. (United States, Sept. 8, '38.) 22869.

MANUFACTURE OF PYDIMIDINE COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie). 22561.

MANUFACTURE OF WATER INSOLUBLE AZODYESTUFFS—A. Carpmael (I. G. Farbenindustrie). 22633.

PRODUCTION OF METALS FROM AMALGAMS.—A. Carpmael (I. G. Farbenindustrie). 22780.

PROCESS FOR PURIFYING OILS.—I. M. Colbeth. 22630.

LIQUID CLARIFICATION.—Compania de Ingenieros Petree y Dorr. (Santo Domingo, Aug. 24, '38.) 22959.

PRODUCTION OF ACROLEIN.—Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. (Germany, Sept. 10, '38.) 22712, 23011.

METHOD OF HARDENING ALUMINIUM, ETC.—J. D. F. Doyle and M. K. F. Doyle. 22755.

COMPOSITIONS CONTAINING UREA-FORMALDEHYDE RESINS.—E. I. du Pont de Nemours and Co., and W. P. Colio. 22587.

ELECTROLYTIC PRECIPITATION OF GOLD.—Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. (Germany, Aug. 6, '38.) 22720

PROCESS FOR PRODUCING SURFACE TENSION-REDUCING SUBSTANCES IN A SOLID FORM.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 22857.

PROCESS FOR CARRYING OUT CATALYTIC REACTIONS, ETC.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 22858.

MANUFACTURE OF WATER-SOLUBLE COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie). 22525.

PRODUCTION OF FAST DYEINGS.—W. W. Groves (I. G. Farbenindustrie). 22659, 22660, 22968.

MANUFACTURE OF MOULDED BODIES FROM CELLULOSE ESTERS.—I. G. Farbenindustrie. (Germany, Aug. 3, '38.) 22526.

MANUFACTURE, ETC., OF NITROGENOUS CONDENSATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Aug. 8, '38.) 22551.

MANUFACTURE, ETC., OF VINYL ESTERS.—I. G. Farbenindustrie. (Germany, Aug. 13, '38.) 22552.

MANUFACTURE OF DYESTUFFS of the phthalocyanine series.—I. G. Farbenindustrie. (Germany, Aug. 9, '38.) 22562.

MANUFACTURE OF DIPHENYLSULPHONE DERIVATIVES.—I. G. Farbenindustrie. (Germany, Aug. 10, '38.) 22634.

MANUFACTURE, ETC., OF INTERPOLYMERISATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Aug. 15, '38.) 22663.

MANUFACTURE OF ESTERS.—I. G. Farbenindustrie. (Germany, Aug. 19, '38.) 22664.

PRODUCTION OF ETHERS.—I. G. Farbenindustrie. (Germany, Aug. 17, '38.) 22849.

MANUFACTURE OF MOLYBDENUM CARBONYL.—I. G. Farbenindustrie. (Germany, Aug. 12, '38.) 22989. (Germany, Dec. 23, '38.) 22990.

PRODUCTION OF BRANCHED DI-OLEFINES.—I. G. Farbenindustrie. (Germany, Aug. 17, '38.) 22991.

MANUFACTURE, ETC., OF VAT DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. (Germany, Aug. 17, '38.) 22992.

VAT DYESTUFF MIXTURES.—I. G. Farbenindustrie. (Germany, Aug. 17, '38.) 22993.

MANUFACTURE OF IRON OXIDE PIGMENTS.—I. G. Farbenindustrie. (Germany, Aug. 10, '38.) 22999, 23000.

MANUFACTURE OF ALKENYLATED AROMATIC HYDROXY CARBOXYLIC ACIDS—I. G. Farbenindustrie. (Germany, Aug. 24, '38.) 23001.

PRODUCTION OF CHLORINATED RUBBER.—L. Mellersh-Jackson (Hercules Powder Co.). 22576.

REMOVAL OF ACID CONSTITUENTS from dilute waste gases.—H. F. Johnstone. (United States, Aug. 25, '38.) 22925.

NON-FERROUS METALS.—Magnesium Metal Corporation, Ltd. (American Magnesium Metals Corporation). 22810.

LIGHT-SENSITIVE DIAZO COMPOUNDS.—H. D. Murray. 22528, 22529.

PRODUCTION OF TITANIUM PIGMENTS.—National Titanium Pigments, Ltd. (Verein für Chemische und Metallurgische Produktion). 22735.

DYES, ETC.—H. C. Olpin and J. Wright. 22884.

ORGANIC AMINE DERIVATIVES, ETC.—Parke, Davis and Co. (United States, Aug. 8, '38.) 22577.

PRODUCTION OF INORGANIC INSULATION, ETC.—Patentverwertungs Ges. (Germany, Aug. 6, '38.) 22719.

MANUFACTURE OF PHOSPHATE FERTILISERS.—Röchling'sche Eisen- und Stahlwerke Ges. (Germany, Aug. 6, '38.) 22828.

MANUFACTURE OF POLYMERISATION PRODUCTS.—Röhm and Haas Ges. (Germany, Aug. 8, '38.) 22878. (Germany, Jan. 23.) 22879.

PREVENTION OF THE AUTOXIDATION OF CHEMICAL SUBSTANCES.—T. Sabalitschka and E. Böhm. (Germany, Aug. 18, '38.) 22996. (Germany, March 21.) 22997.

MANUFACTURE OF POLYSTYRENE.—Soc. des Usines Chimiques Rhone-Poulenc, E. Bachmann, J. Band, and J. G. Favre. 23019.

PROCESS FOR THE SUBSTITUTION CHLORINATION OF SATURATED ALIPHATIC HYDROCARBONS, ETC.—A. H. Stevens (Dow Chemical Co.). 22846.

SINTERED HARD ALLOYS.—Tool Metal Manufacturing Co., Ltd. (Germany, Sept. 1, '38.) 22594.

HYDRATION OF OLEFINES.—Usines de Melle. (France, Sept. 7, '38.) 22983.

IMPREGNATION OF MATERIALS.—V. G. Manufacturing Co., Ltd., and F. M. van Gelderen. 22895.

Complete Specifications Open to Public Inspection

PRODUCTION OF SYNTHETIC RESINS, moulding compositions and powders, and moulded articles. Feb. 4, 1938. 7277/38.

HYDRATION OF VINYL ACETYLENE.—Consortium für Elektro-Chemische Industrie Ges. Feb. 4, 1938. 27881/38.

MANUFACTURE OF DERIVATIVES OF SULPHONAMIDES.—Schering A.-G. Feb. 2, 1938. 35882/38.

ALLOYS FOR USE AT HIGH TEMPERATURES, and articles made therefrom.—Heraeus-Vacuumschemelze A.-G. Feb. 1, 1938. (Cognate applications 35852/38, 36853/38, and 36854/38.) 36851/38.

PRODUCTION OF RESINOUS CONDENSATION PRODUCTS.—Beck, Koller and Co. (England), Ltd. Feb. 2, 1938. (Cognate Application, 37757/38.) 37756/38.

PROTECTIVE MATERIAL against war gases and chemicals, and methods of making the same.—G. Van der Veen. Feb. 7, 1939. (Cognate application 1914/39.) 1913/39.

MANUFACTURE AND USE of high molecular-weight sulphur-containing condensation products.—Silesia Verein Chemischer Fabriken. Feb. 1, 1938. 2053/39.

MANUFACTURE OF CEMENT, alkali metal aluminate, and sulphur dioxide.—I. G. Farbenindustrie. Feb. 2, 1938. 2506/39.

PROCESSES FOR PREPARING BILIARY ACIDS having a ketonic function.—Chimie et Atomistique. Feb. 1, 1938. (Cognate application, 2926/39.) 2925/39.

PHENOL-FORMALDEHYDE CONDENSATION PRODUCTS.—Catalin Corporation of America. Feb. 1, 1938. 3116/39.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. Feb. 1, 1938. 3259/39.

CERAMIC COMPOSITIONS.—Monsanto Chemical Co. Feb. 1, 1938. 3274/39.

SEPARATION OF LACTOFLAVIN AND ITS PHOSPHORIC ESTER.—Naamlooze Vennootschap Organon. Feb. 1, 1938. 3277/39.

MANUFACTURE OF A MIXTURE OF NITRIC AND SULPHURIC ACIDS.—Directie Van de Staatsmijnen in Limburg. Feb. 2, 1938. 3320/39.

TREATMENT OF RUBBER and similar oxidisable substance.—United States Rubber Co. Feb. 3, 1938. 3335/39.

METHOD OF DEVELOPING SILVER CHLORIDE PAPERS.—Gevaert Photo-Producten N.V. Feb. 5, 1938. 3439/39.

MANUFACTURE OF ORGANIC ACID ESTERS OF CELLULOSE.—British Celanese, Ltd. Feb. 2, 1938. 3509/39.

MANUFACTURE OF MELAMINE.—Soc. of Chemical Industry in Basle. Feb. 3, 1938. (Cognate applications 3636/39 and 3637/39.) 3635/39.

ELECTROLYTIC PRODUCTION OF NEUTRAL HYPOCHLORINATED SOLUTIONS.—P. M. R. Salles. Feb. 7, 1938. 3687/39.

PRODUCTION OF PHENOLS from their aqueous solutions.—I. G. Farbenindustrie. Feb. 5, 1938. 3766/39.

PRODUCTION OF SYNTHETIC RESINS, moulding compositions and powders, and moulded articles.—F. Pollak. Feb. 4, 1938. 3890/39.

PREPARATION OF SALTS of sulphocarboxylic acid esters of alcohols.—B. R. Harris. Feb. 11, 1938. 28816/38.

MANUFACTURE OF ADDITION AGENTS for lubricating-oils.—Standard Oil Development Co. Feb. 12, 1938. 34581/38.

REMOVING PHOSPHOROUS AND ARSENIC COMPOUNDS from vanadate solutions.—I. G. Farbenindustrie. Feb. 12, 1938. 35446/38.

CARROTING SOLUTIONS and processes.—Non Mercuric Carrot Co. Feb. 9, 1938. (Cognate Application, 35824/38.) 35823/38.

LUBRICATION OF TEXTILE FIBRES.—Monsanto Chemical Co. Feb. 14, 1938. 37018/38.

STABILISED CUPROUS OXIDE.—Rohm and Haas Co. Feb. 11, 1939. 1193/39.

SETTING OF WET FILMS of film-forming compositions, such as printing-inks.—Interchemical Corporation. Feb. 9, 1938. 2283/39.

FROTHS CONTAINING HYDROCYANIC ACID.—L. Lowenstein. Feb. 14, 1938. (Cognate Applications, 2566/39 and 2567/39.) 2565/39.

ZIRCON REFRACTORIES, and methods of making same.—Titanium Alloy Manufacturing Co. Feb. 10, 1938. 3094/39.

DRY NON-DELIQUESCING CRYSTALLINE SODIUM SULPHIDE, and method of preparing the same.—M. Schwarz, F. O. Zschimmer, E. Zschimmer, R. Schwarz, and W. Schwarz (trading as Zschimmer and Schwarz Chemische Fabrik Dolau, (firm of)). Feb. 11, 1938. (Cognate Application, 3097/39). 3096/39.

MANUFACTURE OF ETHERS of thyroxin or its esters.—Schering, A.-G. Feb. 9, 1938. 3321/39.

RAFFINATION OF MINERAL OILS and tars.—Deutsche Erdol-A.-G. Feb. 10, 1938. 3425/39.

APPARATUS FOR THE CONTINUOUS EXTRACTION OF MATERIAL with a solvent.—S. Zipser. Feb. 9, 1938. 3937/39.

MANUFACTURE AND PRODUCTION OF HIGH EXPLOSIVES of the nitroglycerine series which are difficult to freeze.—I. G. Farbenindustrie. Feb. 10, 1938. 3992/39.

LAYERS SENSITISED by means of a diazonium compound, and methods for the production thereof.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Feb. 10, 1938. 4053/39.

MANUFACTURE OF UREA DERIVATIVES.—Soc. of Chemical Industry in Basle. Feb. 11, 1938. (Cognate Application, 4145/39.) 4144/39.

MANUFACTURE OF BUTADIENE.—Consortium Fur Electrochemische Industrie Ges. Feb. 9, 1938. 4237/39.

MANUFACTURE OF A LIQUID FOAM-FORMING COMPOSITION.—I. G. Farbenindustrie. (Cognate Application, 4287/39.) 4286/39.

POLYMERISATION OF BUTADIENES in aqueous emulsion.—I. G. Farbenindustrie. Feb. 14, 1938. (Cognate Application, 4323/39.) 4322/39.

DISTILLATION OF WOOD and like substances.—H. Boll. Feb. 9, 1939. 4334/39.

APPARATUS FOR CARRYING OUT EXOTHERMIC CATALYTIC GAS-REACTIONS.—E. I. du Pont de Nemours and Co. Feb. 9, 1938. 4336/39.

TREATMENT OF ALLOYS.—Heraeus-Vacuumschmelze, A.-G. Feb. 12, 1938. 4581/39.

PRODUCTION OF HYDROCYANIC ACID.—Deutsche Gold und Silber Scheideanstalt Vorm. Roessler. Feb. 12, 1938. (Cognate Applications, 4742/39, 4743/39, and 4744/39.) 4741/39.

APPARATUS FOR INVESTIGATING BODIES or substances by means of neutrons.—Allgemeine Elektricitats-Ges. Feb. 12, 1938. (Cognate Application, 4750/39.) 4749/39.

Specifications Accepted with Date of Application

MANUFACTURE AND PRODUCTION OF SYNTHETIC RESINS from methylol or methylene compounds of urea or thiourea.—G. W. Johnson (I. G. Farbenindustrie). Feb. 4, 1938. 510,682.

PRODUCTION OF AMINO-SUBSTITUTED ARYLOXY-ALKANOL ARSENO COMPOUNDS.—Parke, Davis and Co. Sept. 2, 1937. 510,683.

PRODUCTION OF COATINGS ON METAL.—Pyrene Co., Ltd., W. J. Clifford and H. H. Adams. Feb. 4, 1938. (Cognate application 2901/39.) 510,684.

MANUFACTURE AND PRODUCTION OF DIHYDROFURANES.—G. W. Johnson (I. G. Farbenindustrie). Feb. 7, 1938. 510,615.

TREATMENT OF MOLTEN METAL AND ALLOYS.—W. V. Gilbert. Feb. 22, 1938. 510,369.

MANUFACTURE OF MOTOR FUELS by polymerisation of olefins.—Standard Oil Development Co. Aug. 10, 1937. 510,478.

ALUMINIUM ALLOYS.—I. Igarashi and G. Kitahara. June 17, 1938. 510,483.

LIGHT METAL ALLOYS.—E. Heinkel. June 28, 1937. 510,635.

MANUFACTURE OF SYNTHETIC RUBBER.—Istituto per lo Studio Della Gomma Sintetica.—July 19, 1937. 510,636.

MANUFACTURE OF SECONDARY HIGHER ALCOHOLS.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). July 19, 1938. 510,637.

MANUFACTURE AND PRODUCTION OF BUTANE POLYCARBOXYLIC ACIDS. G. W. Johnson (I. G. Farbenindustrie). July 20, 1938. 510,638.

PROCESS FOR MANUFACTURING CYCLIC HYDROCARBONS from aliphatic hydrocarbons.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 27, 1937. 510,644.

DAMP RESISTING COMPOSITION usable as a paint or plaster or grouting for building structures.—G. M. Skinner Pty., Ltd. Sept. 10, 1937. 510,485.

PROTECTION OF MAGNESIUM RICH ALLOYS.—High Duty Alloys, Ltd., and F. A. Allen. Sept. 13, 1938. (Addition to 482,689.) 510,487.

METHOD OF IMPROVING THE STABILITY OF ALKALINE SOLUTIONS containing azo dyestuff components of an exclusively phenolic nature. Naamlooze Vennootschap Chemische Fabriekl. Van der Grinten. Nov. 5, 1937. 510,407.

METHOD OF MAKING PLASTIC MATERIALS.—Kohle und Eisenforschung Ges., and Gelsenkirchener Bergwerks A.-G. Dec. 1, 1937. 510,654.

LUBRICATING OIL.—Texaco Development Corporation. Dec. 18, 1937. 510,496.

PROTECTION OF POROUS MATERIALS against rot, corrosion and the like.—W. V. Gilbert. Dec. 3, 1938. 510,420.

OBTAINING PERSALTS, e.g., persulphates, by electrolysis.—C. Trinius and H. Giesler (trading as Giesler and Trinius, firm of). Feb. 1, 1938. 510,429.

MANUFACTURE AND USE OF HIGH MOLECULAR WEIGHT SULPHUR-CONTAINING CONDENSATION PRODUCTS.—Silesia, Verein Chemische Fabriken. Feb. 1, 1938. 510,666.

BURNING OF CEMENT and the sintering of similar raw materials.—N. Ahlmann. Jan. 5, 1938. 510,786.

PRODUCTION OF HYDROGENATED OILS and semi-solid fats, and the products thereof.—L. Mellersh-Jackson (Inter-metal Corporation). Nov. 30, 1937. 510,698.

PROCESS FOR THE MANUFACTURE OF AZO COMPOUNDS of acid character.—Schering, A.-G. Dec. 30, 1936. (Samples furnished.) 510,868.

LIGHT-SENSITIVE DIAZOTYPE LAYERS.—S. C. and P. Harding, Ltd., and W. P. Leuch. Jan. 7, 1938. 510,874.

PRODUCTION OF FILMS, coatings, fibres, and other shaped structures from aqueous compositions containing protein material.—R. V. Seddon, A. McLean and Imperial Chemical Industries, Ltd. Jan. 7, 1938. 510,875.

MANUFACTURE AND PRODUCTION OF AMINO-KETONES.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 3, 1938. (Cognate Application, 7878/38.) 510,876.

PREPARING NITROCELLULOSE.—Kodak, Ltd. Feb. 4, 1937. 510,705.

METHOD FOR THE PRODUCTION OF CELLULOSE from maize stalks or other grasses.—B. Dorner. Feb. 4, 1938. 510,716.

MANUFACTURE OF STABLE EMULSIONS and dispersions of polymerisation products.—W. W. Groves (I. G. Farbenindustrie.) Feb. 5, 1938. 511,036.

MANUFACTURE AND APPLICATION OF CARBOXYLIC ACID ESTERS, amides, and ester-amides.—W. W. Groves (I. G. Farbenindustrie.) Feb. 7, 1938. 511,132.

MANUFACTURE AND PRODUCTION OF DIHYDROFURANES.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 7, 1938. 510,949.

PRODUCTION OF METALLIC COATINGS or layers by the vaporisation of alloys in a high vacuum.—Siemens and Halske, A.-G. Feb. 6, 1937. 510,793.

REMOVAL OF THIONATES from solution.—N. Levy, Imperial Chemical Industries, Ltd., and Bolidens Gruvaktiebolag. Feb. 8, 1938. 510,804.

ANTHRAQUINONE COMPOUNDS.—N. H. Haddock, and Imperial Chemical Industries, Ltd. Feb. 9, 1938. 510,888.

PRODUCTION OF NITROUS OXIDE.—Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours and Co.). Feb. 9, 1938. 510,889.

DERIVATIVES OR COMPOUNDS OF TANNIC ACID.—British-United Chemicals, Ltd. Feb. 12, 1937. 510,891.

PRODUCTION OF DISPERSIONS and emulsions.—R. Kimbara. March 17, 1937. 511,043.

MAGNESIUM ALLOYS.—Magnesium Elektron, Ltd. (I. G. Farbenindustrie.) Feb. 9, 1938. (Cognate Application, 23468/38.) 511,137.

MANUFACTURE OF THIURONIUM SALTS.—W. W. Groves (I. G. Farbenindustrie.) Feb. 10, 1938. 511,144.

MANUFACTURE OF ACETIC ANHYDRIDE.—H. Dreyfus. Feb. 10, 1938. 510,959.

POLYMERISATION OF ESTERS and nitriles of acrylic and methacrylic acids.—Rohm and Haas, A.-G. March 16, 1937. (Samples furnished.) 510,961.

MANUFACTURE OF LUBRICANTS.—F. W. Kirkbride, and Imperial Chemical Industries, Ltd. Feb 10, 1938. 510,964.

CONTAINERS FOR GASES condensed by absorbents.—T. D. Kelly. Feb. 11, 1938. 511,047.

MANUFACTURE OF PLASTIC MASSES, films, or lacquers from nitrocellulose and chlorinated rubber or a chlorine-containing vinyl resin.—Deutsche Celluloid-Fabrik, A.-G. Feb. 18, 1937. 511,154.

SOLVENT EXTRACTION OF HYDROCARBON OILS.—Standard Oil Development Co. Sept. 8, 1937. 510,896.

PROCESS FOR THE MANUFACTURE OF BERYLLIUM OXIDE.—Seri Holding Soc. Anon. Feb. 12, 1937. 511,157.

MANUFACTURE OF THREADS, films, ribbons, tubes and like forms of polymerised ethylene.—J. R. Myles, L. L. Bache, and Imperial Chemical Industries, Ltd. Feb. 11, 1938. 511,054.

PREPARATION OF PALE COLOURED ALKYL RESINS.—Resinous Products and Chemical Co. March 6, 1937. 510,899.

MANUFACTURE AND PRODUCTION OF CARBOXYLIC ACID CHLORIDES and carboxylic acids.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 19, 1938. 510,901.

MANUFACTURE AND PRODUCTION OF LACQUERS and plastic masses. G. W. Johnson (I. G. Farbenindustrie.) Feb. 26, 1938. 510,902.

RECOVERY OF CORONENE.—I. G. Farbenindustrie, and G. W. Johnson. March 2, 1938. (Addition to 435,254.) 510,736.

MANUFACTURE AND PRODUCTION OF UNSATURATED NITROGENOUS CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) March 14, 1938. 510,904.

FILTERS.—Stream-Line Filters, Ltd., and A. Beale. March 15, 1938. 510,817.

PROCESSES FOR THE MANUFACTURE OF ANODES for use in the production of aluminium, beryllium, magnesium, or alkali earth metals by electrolysis of fused starting materials.—Ges. Zur Verwertung Chemisch Technischer Verfahren Vaduz. March 16, 1937. (Cognate Application, 8104/38.) 511,076

MANUFACTURE AND PRODUCTION OF SUBSTANCES having tanning action.—I. G. Farbenindustrie. March 30, 1938. (Addition to 494,871.) 510,743.

ALKALINE DETERGENT COMPOUNDS.—Griffith Laboratories, Inc. April 30, 1937. 510,911.

UREA FORMALDEHYDE RESINS.—Resinous Products and Chemical Co. April 30, 1937. 511,087.

PURIFICATION, CONCENTRATION AND SEPARATION OF COLLOIDAL DISPERSIONS BY ELECTROPHORES.—Semperit Osterreichisch-Amerikanische Gummiwerke, A.-G. May 12, 1937. 511,088.

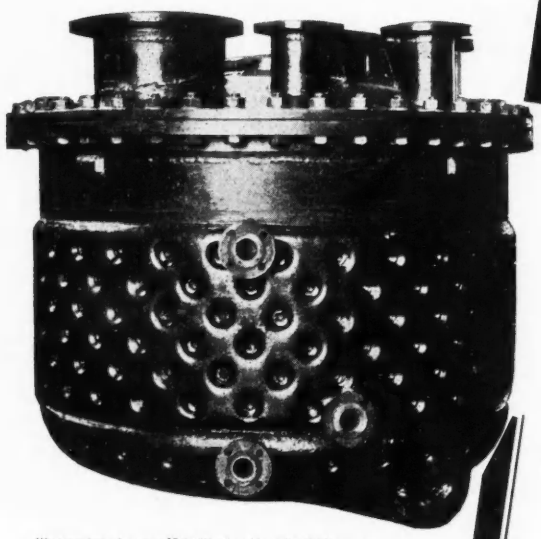


Illustration shows a Distillation Vessel 1,600 m.m. diameter 1,600 m.m. high with heating jacket for 32 atmos. working pressure. Made in steel, clad steel, or rustless steel.

In modern chemical apparatus the highest steam pressures can be successfully met by the adoption of either the SAMKA Piping System or the SAMKA Double Walls. These heat-transferring surfaces enable the inner wall of the vessels to be restricted to the least dimensions, which in the case of expensive metals is a definite economic advantage.

Write for full explanatory leaflet.

ALL THESE MATERIALS

STEEL

ENAMELLED STEEL

CHROME & CHROME-NICKEL-STAINLESS STEELS

NICKEL - MONEL - COPPER

ALUMINIUM - CAST STEEL

COPPER CLAD STEEL

SILVER CLAD STEEL

NICKEL CLAD STEEL

ARE APPLICABLE TO

"Samka" PIPING & DOUBLE WALLS

Henry Balfour & Co Ltd

DURIE FOUNDRY + LEVEN FIFE.

LONDON OFFICE: ARTILLERY HOUSE, ARTILLERY ROW, LONDON, S.W.1

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ATLAS LIME WORKS, LTD, Upper Beeding. (M., 26/8/39.) Aug. 9, £500 deb., to Hove Seaside Villas, Ltd.; general charge. *Nil. Dec. 31, 1938.

BROUGH AND CO. (MACCLESFIELD), LTD., silk dyers. (M., 26/8/39.) Aug. 11, mort. and deb., to District Bank, Ltd., securing all moneys due or to become due to the Bank; charged on mill and property in Derby Street and Exchange Street, Macclesfield, etc., also general charge. *Nil. May 20, 1939.

HYDRO-PLASTICS, LTD., London, E.C. (M., 26/8/39.)—Aug. 9, series of £5,775 registered notes with a premium of 9/0 for each 21/0 of the principal sum; general charge. *Nil. Jan. 13, 1939.

"LIMAX," LTD., fertilisers manufacturers. (M., 26/8/39.) Aug. 11, £3,000 debs.; general charge.

MANCHESTER OIL REFINERY, LTD., London, E.C. (M., 26/8/39.) Aug. 10, conveyance securing £155 perpetual yearly rent charge, to Trustees for debenture holders of Trafford Park Estates, Ltd.; charged on long forming part of the Trafford Park Estate, Davyhulme, Urmston. *£352. Sept 21, 1938.

Companies Winding Up Voluntarily

BRITISH NATIONAL PETROLEUM REFINERIES, LTD. (C.W.U.V., 26/8/39.) General meeting of members and creditors October 31, 1939; Harold Alexander Leach, liquidator.

Receiverships

FORBES PLASTIC MOULDINGS, LTD., Stamford Bridge (Yorks.). (R., 26/8/39.) E. J. Pulleyn, 8 Coppergate, York. Aug. 11.

Notice of Dividend

TUDOR LABORATORIES, LTD., 9 Southampton Street, London, W.C.1. First and final, 1s. 1½d. per £1. Payable August 18. Office of the Official Receiver and Liquidator, 33 Carey Street, Lincoln's Inn, London, W.C.2.

Company News

Roche Products, Ltd., have increased their nominal capital by the addition of £100,000, in £1 ordinary shares, beyond the registered capital of £100,000.

The Distillers Co. has concluded an arrangement with the British Xylonite Co. to take a half-interest in B.X. Plastics, the wholly owned subsidiary of the British Xylonite Co.

Paterson Engineering Co. report a net profit for the year to April 30 of £33,332 (£32,586). A dividend of 10 per cent. and a bonus of 2½ per cent. (same) has been declared on the ordinary shares. The carry-forward is £34,543 (£25,856).

E. I. du Pont de Nemours and Co., Inc., have declared a dividend of $1.25 per share on their $20 common stock. This is the same as paid the previous quarter but compares with 75c. paid a year ago.

New Companies Registered

British Surgical Industries, Ltd. (356,103).—Private company. Capital: £100 in 2,000 shares of 1s. each. To carry on business as manufacturers of and dealers in chemicals, gases, drugs, medicines, surgical, hospital and scientific apparatus, etc. Subscribers: Arthur C. Greene, M.B., Kenwood, Gower Road, Weybridge, Surrey; Nevile de Lacey. Solicitor: B. P. Webster, 20 Hanover Square, W.1. Registered office: 4 Bryanston Street, W.1.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Egypt.—The Commercial Counsellor to His Majesty's Embassy reports that the Ministry of Agriculture is calling for tenders for the supply and delivery of quantities of white mineral oil, casein, oleic acid and ammonia liquid. Tenders should be addressed to the Department of Stores and Purchases, Ministry of Agriculture, Dokki, by whom they will be received up to 11 a.m. on September 26, 1939. Local representation is essential, and this Department is prepared to furnish firms desirous of tendering for the supply of chemicals of United Kingdom manufacture, and not represented in Egypt with the names of United Kingdom merchant houses with local connections who may be willing to handle tenders on their behalf. All telephonic communications with the Department of Overseas Trade in regard to this tender should be addressed exclusively to Extension 253.

Chemical and Allied Stocks and Shares

BEARING in mind the added uncertainty attaching to international affairs, the general tendency of the stock and share markets has been better than seemed likely at the beginning of the week when there was an all-round marking down of share values. The undertone became steadier when it was apparent that no heavy selling was to develop, and earlier declines were partly regained, although the volume of business remained extremely small and there was little indication that the reduced prices were attracting buyers, the general tendency being to await further clarification of the international situation.

* * * *

Movements in share values have to be read in relation to the surrounding tendency which has ruled on the Stock Exchange, and in sympathy with the latter, securities of chemical and allied companies were mostly lower on balance for the week. Imperial Chemical went back to 27s. 6d. at one time, but later recovered to 28s. 9d. which, however, compares with 30s. 3d. a week ago. The market is anticipating that the interim dividend is likely to be kept at 3 per cent. and that there seem reasonable possibilities of the total being maintained at 8 per cent., athough it is recognised that at the last meeting it was indicated that large sums would continue to be added to reserve funds. British Oxygen, Turner and Newall, Murex, Lever and Unilever and other widely-held shares were lower owing to the prevailing market tendency. On the other hand, British Match were steady at 34s. 9d. and B. Laporte at 60s. were within 1s. of the price ruling a week ago, while Fison Packard, which were aided by market hopes of a moderately larger dividend, were 40s. 9d., or only 6d. lower on balance. Metal Box, exceptionally, were higher on the week at 74s. 3d. compared with 73s. 9d. British Aluminium went back from 57s. to 55s.

* * * *

Most iron and steel shares declined sharply, including Stewarts and Lloyds, which were 41s. 9d. compared with 43s. 6d., Guest Keen 23s. 9d. compared with 25s. and Tube Investments 87s. compared with 90s. Staveley Coal and Iron were fairly steady, awaiting the dividend announcement. The latter is expected in the market to be below the rate paid for the previous year, but it is being assumed that it will probably be such as would give a satisfactory yield on the shares at their current level.

* * * *

Imperial Smelting were little changed at 9s. and General Refractories remained around 7s. On the other hand British Plaster Board reacted from 30s. to 28s., and Tunnel Cement from 38s. 9d. to 37s., but the last-named is "ex" the interim dividend. Cellon were again 15s. 6d. and most paint shares were little changed on balance. Pinchin Johnson kept around the lower price of 21s. 9d. ruling last week, awaiting the interim dividend announcement. Triplex Glass declined 3s. 3d. to 31s. 3d., partly owing to the deduction of the dividend from the price, while United Glass Bottle were marked down 1s. 3d. to 48s. 9d., although it continues to be anticipated in the market that the interim dividend is likely to be maintained. British Glues, although less active, have improved from 4s. 9d. to 5s. British Oil and Cake Mills preferred ordinary declined 6d. to 39s. 6d. United Molasses fluctuated sharply, but at 23s. have recovered part of an earlier fall. Distillers, which were 93s., compared with 96s. 6d. a week ago, were unresponsive to the news that the company has concluded an arrangement to acquire a half-interest in the B.X. Plastics Co.

* * * *

William Blythe at 6s. and Monsanto Chemicals 5½ per cent. preference at 21s. 10½d. were maintained, but were inactive, as were Lawes Chemical, which were again quoted at 7s. 6d. British Drug Houses remained around 21s. 3d. but Sangers were moderately lower at 20s. and Timothy Whites and Taylors reacted to 21s. 6d. On balance Boots Drug moved down from 43s. to 41s. 9d., and Beechams Pills deferred were slightly lower at 7s. 10½d. "Shell" and Royal Dutch were marked down sharply among oil shares, which reflected the reactionary tendency shown by most securities with an international market.